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DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

FEDERAL AID IN FISH RESTORATION
Job Performance Report
Project F-71-R-16

REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS

Job No. 3-a. Region 3 (Nampa) Mountain Lakes Investigations
Job No. 3-b. Region 3 (Nampa) Lowland Lakes and Reservoirs Investigations
Job No. 3-c. Region 3 (Nampa) Rivers and Streams Investigations
Job No. 3-d. Region 3 (Nampa) Salmon and Steelhead Investigations
Job No. 3-e. Region 3 (Nampa) Technical Guidance

By

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JOB PERFORMANCE REPORT

State of: Idaho **Name:** Regional Fishery Management Investigations

Project No.: F-71-R-16 **Title:** Region 3 (Nampa) Mountain Lakes Investiaations

Job No.: 3-a

Period Covered: July 1, 1991 to June 30, 1992

ABSTRACT

No formal sampling was conducted by regional fishery personnel at mountain lakes in 1991.

A total of 48 alpine lakes were stocked in 1991 with a combination of three salmonid species. Westslope cutthroat trout Oncorhynchus clarki bouvieri were the most prominent species stocked, followed by rainbow trout O. mykiss and Arctic grayling Thymallus arcticus.

Cooperation with the U.S. Forest Service (USFS) to minimize the impacts of alpine lake stocking in the Sawtooth National Recreation Area was explored in 1991. An agreement to not stock barren or previously unstocked lakes without the concurrence of USFS was drafted and agreed to in principle. In addition, those lakes that have been traditionally stocked will continue.to be stocked in the future.

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OBJECTIVES

To maintain information for fishery management activities and decisions for mountain lakes.

INTRODUCTION

Mountain lakes in Idaho Department of Fish and Game (IDFG) Region 3 (Nampa) are stocked on a two- or three-year rotational basis, depending on angling pressure and angler accessibility. Generally, salmonid fingerlings are stocked from McCall Fish Hatchery via fixed-wing airplane.

RESULTS

In 1991, a total of 48 alpine lakes were stocked in three drainages with a combination of three salmonid species (Table 1).

The U.S. Forest Service (USFS) expressed concern regarding IDFG fish management activities in the Sawtooth National Recreation Area in future years. The two parties agreed to stock only lakes which were previously stocked, to make no new introductions of non-native species, and to limit the species stocked to those historically planted.

General angler observations were received regarding several mountain lakes. A summary of alpine lakes and results are listed in Table 2.

RECOMMENDATIONS

1. Gather a core data set from all Region 3 (Nampa) alpine lakes, as time allows. Increased angler use at alpine lakes will continue to warrant additional management emphasis.

2. Continue the species diversity program in alpine lakes to supply additional fishing opportunities.

3. Develop a complete set of Loran coordinates for all mountain lakes in the Region.

Table 1. Summary of mountain lakes stocked with salmonid fingerlings in 1991 in Region 3 (Nampa).

Lake	Drainage	Location	Species	Number Stocked
Sulphur Creek Pond	07-1071	14N 9E 21	C2	500
Bernard #1	07-1096	13N 8E 21	C2	1,000
Red Mountain #1	09- 121	ION 9E 4	C2	500
Red Mountain #4	09- 124A	11N 9E 33	C2	500
Braxton #1	09- 153	9N12E 25	C2	500
Braxton #2	09- 154	9N12E 25	C2	500
Bead #1	09- 159	9N12E 34	C2	500
Blue Rock	09- 163	9N12E 33	C2	500
Feather	09- 165	9N12E 34	C2	500
Coney	09- 167	9N12E 32	C2	500
McWillard	09- 168	8N12E 4	C2	500
Oreammus	09- 169	8N12E 4	C2	500
Packrat	09- 170	8N12E 8	C2	500
Limber	09- 174	8N12E 8	C2	500
Benedict	09- 193	7N12E 4	C2	500
Hidden	09- 226	12N BE 25	C2	500
Virginia	09- 230	8N13E 31	C2	1,000
Edna #1	09- 234	7N13E 6	C2	1,500
Lodgepole Creek	09- 310	6N10E 5	C2	500
Warrior #2	09- 311	6N10E 5	C2	500
Big Scenic	10- 211	7N11E 35	C2	1,000
Diamond	10- 218	7N11E 23	C2	750
Triangle	10- 220	7N11E 23	C2	750
Browns	10- 221	7N11E 23	C2	1,000
Nancy Creek	10- 230	6N12E 6	C2	1.000
Cliff	10- 250	7N11E 13	C2	500
Corbus	10- 266	5N10E 24	C2	750
Misfire #2	10- 270	6N12E 8	C2	750
Pancho	10- 275	7N12E 17	C2	1,000
Timpa	10- 278	7N12E 22	C2	1,000
Surprise	10- 279	7N12E 22	C2	1,000
Confusion	10- 280	7N12E 15	C2	1,000
Low Pass	10- 281	7N12E 15	C2	1,000
Heart	10- 292	7N12E 13	C2	1,000
Blue Jav	10- 308	7N10E 31	C2	1.000
Pats	10- 315	7N11E 1	C2	500
The Hole	10- 320	7N11E 14	C2	1,000
Cow	10- 355	8N10E 20	C2	750
Edna #2	09- 241	7N13E 6	R1	1,000
3 Sisters #2	10- 195	3N BE 2	R1	500
3 Sisters #3	10- 196	3N 8E 2	R1	1,000
Queens River #5	10- 232	6N 11E 2	R1	1,000
Slide	10- 251	7N 11E 13	R1	500
Plummer	10- 254	7N 12E 17	R1	1,000
Leggit	10- 262	5N 12E 16	R1	500
Baron #3	09- 148	9N 12E 27	GR	1,000
Elk	09- 183	8N 12E 16	GR	500
Island	10- 298	7N 13E 18	GR	500
Total Stocked			C2	27,750
			R1	5,500
			GR	2,000

Drainage

07 = Salmon River
09 = Payette River
10 = Boise River

Species

C2 = Westslope cutthroat trout
R1 = Rainbow trout, unspecified stock
GR = Arctic grayling

Table 2. Summary of data collected from mountain lakes in 1991.

Lake	Catalog Number	Last Year Stocked	Species Stocked[1]	Comments
Zumwalt	09-134	1989	C2	Caught numerous 4" to 6" and 7.5" to 9" rainbow trout. Observed natural reproduction.
Lake Creek #1	09-175	1990	C2	No fish caught or observed.
Lake Creek #2	09-176	NA	NA	No fish caught or observed.
Pinchot Creek #2	09-178A	1988	GR	Large numbers of 6"
Pinchot Creek #3	09-178B	1988	GR	Numerous 6" and 12" Spawning fish observed.
Pitchfork Creek	09-180	1990	GR	Observed 6" GN, grayling.
Fall Creek #1	09-185	1989	C3	Numerous 10" cutthroat.
Fall Creek #2	09-186	1989	C3	Many 6" and 11" cutthroat.
Fall Creek #3	09-187	1990	GR	Numerous 6" and 12"
3 Sisters #2	10-195	1989	C2	No fish caught or observed.
3 Sisters #3	10-196	1989	C2	No fish caught or observed.
Corbus	10-266	1988	C2	Caught numerous 9" cutthroat. Receives heavy pressure.
Matingly Creek	10-268	NA	NA	No fish caught or observed.
Flytrip #1	10-287	NA	NA	Many 7" grayling.
Heart	10-292	1989	C2	Observed fish. Moderate fishing pressure.
P.S. #1	10-294	NA	NA	Many cutthroat observed, ranging from 1.5" to 13". Low fishing pressure.
P.S. #2	10-295	NA	NA	Many cutthroat observed, ranging from 1.5" to 13". Low fishing pressure.
P.S. #4	10-296	NA	NA	Easy to catch 11" to 16" cutthroat.
Lodgepole	10-310	1989	C2	Caught few cutthroat. Extremely heavy fishing pressure.
Warrior #2	10-311	1989	C2	Maximum size of 12" cutthroat. Moderate fishing pressure.
Cow	10-355	1988	C2	Caught 15+" cutthroat. Moderate angling pressure.

[1] C2 = Westslope cutthroat trout
C3 = Henry's Lake cutthroat trout
GR = Arctic grayling
GN = California golden trout

JOB PERFORMANCE REPORT

State of: Idaho **Name:** Reaional Fishery Management Investiɣations

Project No.: F-71-R-16 **Title:** Reaion 3 (Nampa) Lowland Lakes and Reservoirs Investigations

Job No.: 3-b

Period Covered: July 1, 1991 to June 30, 1992

ABSTRACT

Brownlee Reservoir

A total of 560 smallmouth bass Micropterus dolomieu were sampled, with a mean length of 265.9 mm. Mean relative weight (W_r) for all length groups exceeded 105. These indicators are both substantially increased over 1989 sampling of identical transects.

Bull Trout Lake

Stunted brook trout Salvelinus fontinalis continue to dominate the harvest. One hundred forty-one brook trout were sampled, with a mean length of 183 mm, and ranging from 110 mm to 290 mm.

C.J. Strike Reservoir

A total of 1,064 marked largemouth bass M. salmoides were stocked to evaluate supplementing the largemouth bass population with fish in excess of 250 mm. Major fishing tournaments will continue to be monitored for the next two years to assess the consequences.

Largemouth bass and channel catfish Ictalurus punctatus were reared in the ponds at Cottonwood Campground for a fall release of juvenile fish.

Deadwood Reservoir

A late-summer release of 50,000 acre feet of water caused an evacuation of game fish from Deadwood Reservoir. Impacts of the 1991 drawdown will have a detrimental effect for the next three to five years.

Weirs were placed on Basin and Wild Buck creeks to control kokanee Oncorhvnchus nerka kennerlvi recruitment into Deadwood Reservoir. Mean length of spawning kokanee continued to decrease to 250 mm. Fall gill net sampling revealed Atlantic salmon Salmo salar in excess of 650 mm.

Lake Lowell

An emergency closure was enacted during June to protect the depressed largemouth bass population. Spring sampling indicated all fish populations were depressed, possibly due to winter kill. Largemouth bass and bluegill Lepomis macrochirus were stocked back into the lake during the summer and fall by the Idaho Department of Fish and Game (IDFG) and local fishing clubs from private ponds and commercial sources.

Lucky Peak Reservoir

An intense creel survey showed an estimated 162,505 hours of angling effort (23 h/hectare or 57 h/acre) from November 1, 1990 to October 2, 1991, with a catch of 49,772 game fish. Bank anglers comprised 57 percent of the angling population.

Owyhee County Reservoir Development

Four reservoir sites were evaluated in Owyhee County for possible construction of recreation/fishery enhancement projects. Due to cost effectiveness concerns and heavy metal contamination, all four sites were dismissed. The Bureau of Reclamation and IDFG will continue to investigate other possible locations.

Drought Impacts

Lake Lowell and Paddock, Succor, Mountain Home, Crane Creek, Indian Creek, Arrowrock, and Lucky Peak reservoir fisheries were all devastated by drought in 1991. Impacts of continuing drought will be experienced for the next three to five years. Repopulation of these waters will commence when adequate water returns to support year-round fish populations.

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OBJECTIVES

To maintain information for fishery management activities and decisions for lowland lakes and reservoirs.

INTRODUCTION

Fishery management personnel perform a variety of activities on lakes and reservoirs on an annual basis to have current knowledge of individual fish populations and, in some cases, fish community structure. This is a summary of fishery management activities conducted in 1991 on lakes and reservoirs within the Region 3 (Nampa) area.

METHODS

Fishery personnel sampled lakes and reservoirs using electrofishing gear (Smith-Root SR-16 electrofishing boat, Coffelt VVP-2E pulsator, Smith-Root battery powered backpack unit). Experimental gill nets were 100 ft long and composed of four 25 ft x 6 ft panels with 0.5-in, 0.75-in, 1.0-in, and 1.25-in mesh, respectively. Trap nets were 3/8-in mesh hoop nets with 50 ft lead lines.

RESULTS

Brownlee Reservoir

Idaho Department of Fish and Game (IDFG) personnel, in conjunction with the Oregon Department of Fish and Wildlife (ODFW), electrofished the night of May 2 to collect data on game fish, primarily smallmouth bass Micropterus dolomieu. A total of 560 smallmouth bass with a mean length of 265.9 mm were electrofished (Figure 1). This represents an increase of approximately 30 mm in mean length from sampling conducted on the same transects in 1989. Mean relative weights (W_r) for all sampled length groups exceeded 105 (Table 1), while in 1989 all mean relative weights for smallmouth bass were less than 100.

Table 1. Mean relative weight (W_e) per 50 mm group for smallmouth bass sampled by electrofishing in Brownlee Reservoir on May 2, 1991.

Length Group (mm)	Number	Mean Relative Weight (W_r)
51 - 100	0	-
101 - 150	2	119.5
151 - 200	30	110.9
201 - 250	31	106.7
251 - 300	82	107.6
301 - 350	0	-
351 - 400	0	-
401 - 450	2	121.0

Aging of smallmouth bass collected indicates that legal size (305 mm) is not achieved until 4+ years of age (Table 2), due to regeneration of scale annuli; however, aging was extremely difficult in fish exceededing 3 years of age. Age I and II smallmouth bass showed increased mean growth rates of approximately 15 mm and 25 mm, respectively, over bass aged in 1989 (Region 3 files).

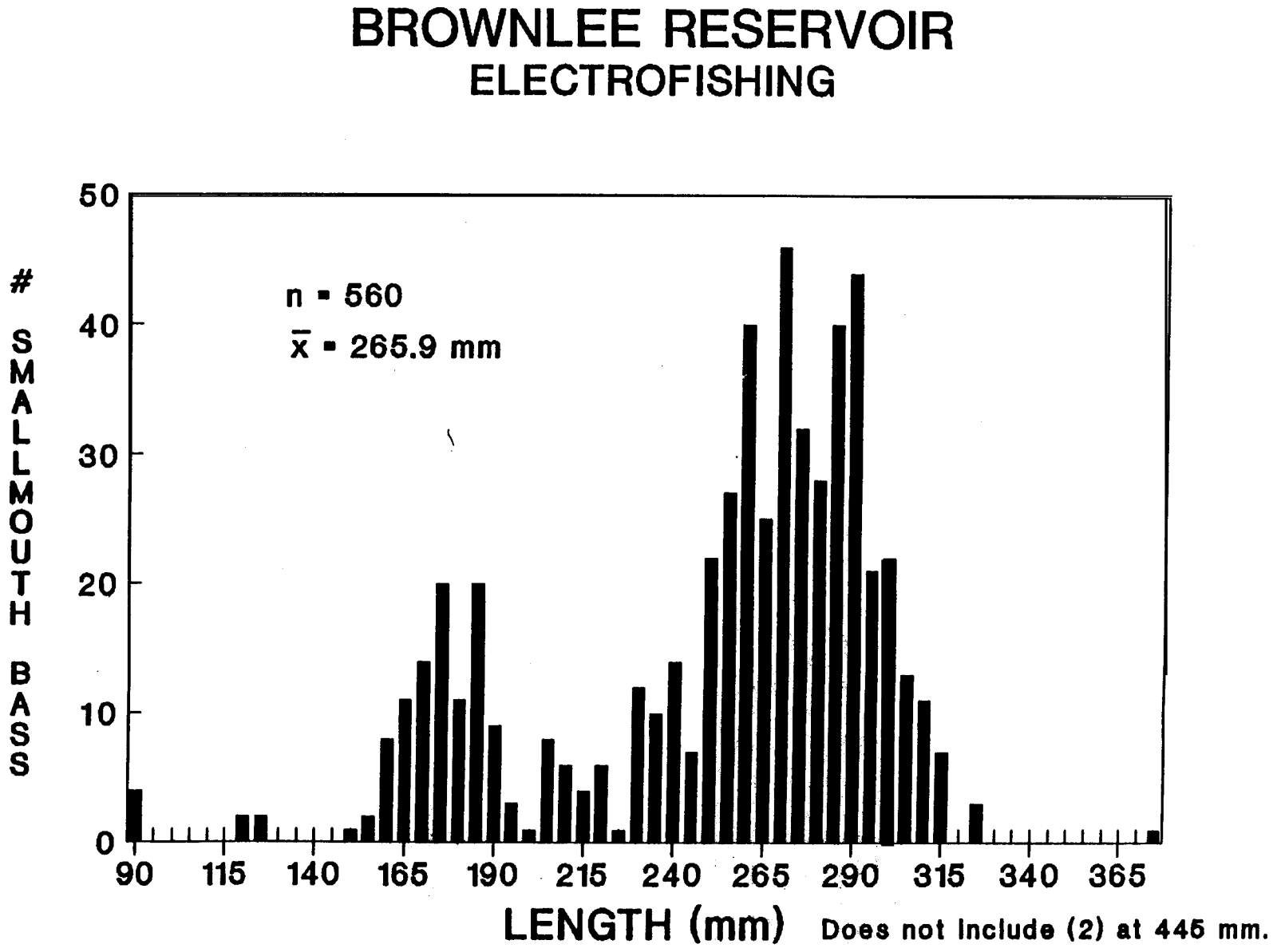


Figure 1. Length frequency distribution of smallmouth bass captured in Brownlee Reservoir on May 2, 1991.

Table 2. Average length (mm) at age calculated for smallmouth bass collected at Brownlee Reservoir on May 2, 1991. (Data is a summary of bass captured by the Oregon Department of Fish and Wildlife and the Idaho Department of Fish and Game).

Age	I	II	III	IV	V	VI	VII	VIII	IX
Mean Length (mm)	47	151	216	247	266	388	422	434	441
N =	62	62	46	30	9	1	1	1	1

Increased growth can be partially attributed to reduced runoff and increased water retention and/or the elimination of spring flood control drawdown the past two years, which may have lead to increased reservoir productivity and a decrease in forage fish mortality, primarily of juvenile crappie.

Trout remained the target species during the fall and winter periods. ODFW stocked 474,522 rainbow trout Oncorhynchus mykiss (11,300 lbs); IDFG stocked 524,670 rainbow trout (42,699 lbs). The vast majority of trout were fingerling sized (less than 200 mm) and will be recruited into the fishery during 1992.

Bull Trout Lake

A total of two experimental gill nets and one trap net were set overnight (13.5 h) in Bull Trout Lake on October 4 and 5. Captured were 141 brook trout Salvelinus fontinalis and 1 Atlantic salmon Salmo salar. Brook trout averaged 183 mm in length, with a range of 110 mm to 290 mm (Figure 2). The lone Atlantic salmon measured 202 mm total length.

Due to adverse weather conditions while setting nets, the locations of nets were not conducive to the collection of a larger sample of Atlantic salmon. Angler reports indicate our sample is not an indicator of Atlantic salmon abundance or size. Further sampling will be conducted in the spring of 1992.

C.J. Strike Reservoir

This mainstem Snake River reservoir fishery has been changing in recent years, with a higher proportion of the angling pressure being targeted on trout in the fall, winter, and early spring. The traditional bass fishery has increased in popularity, with smallmouth bass supporting over 90 percent of the catch. Largemouth bass M. salmoides are not numerous, but grow to large size (3,500 g to 4,500 g). Channel catfish Ictalurus punctatus and black crappie Pomoxis niaromaculatus have diminished in angler catches over the years.

In 1990 and 1991, IDFG stocked white crappie P. annularis in the reservoir in an attempt to bolster the crappie fishery. In 1991, marked largemouth bass of sublegal and legal size were stocked in C.J. Strike Reservoir to determine the feasibility of improving the largemouth fishery with supplementation of relatively small numbers of fish. A total of 1,064 largemouth bass, marked with both left and right maxillary clips, were stocked during May and June at a cost of approximately $1,200. The 1991 tournaments were monitored, and marked largemouth (17) dominated the minor largemouth component of the tournament catches (Table 3).

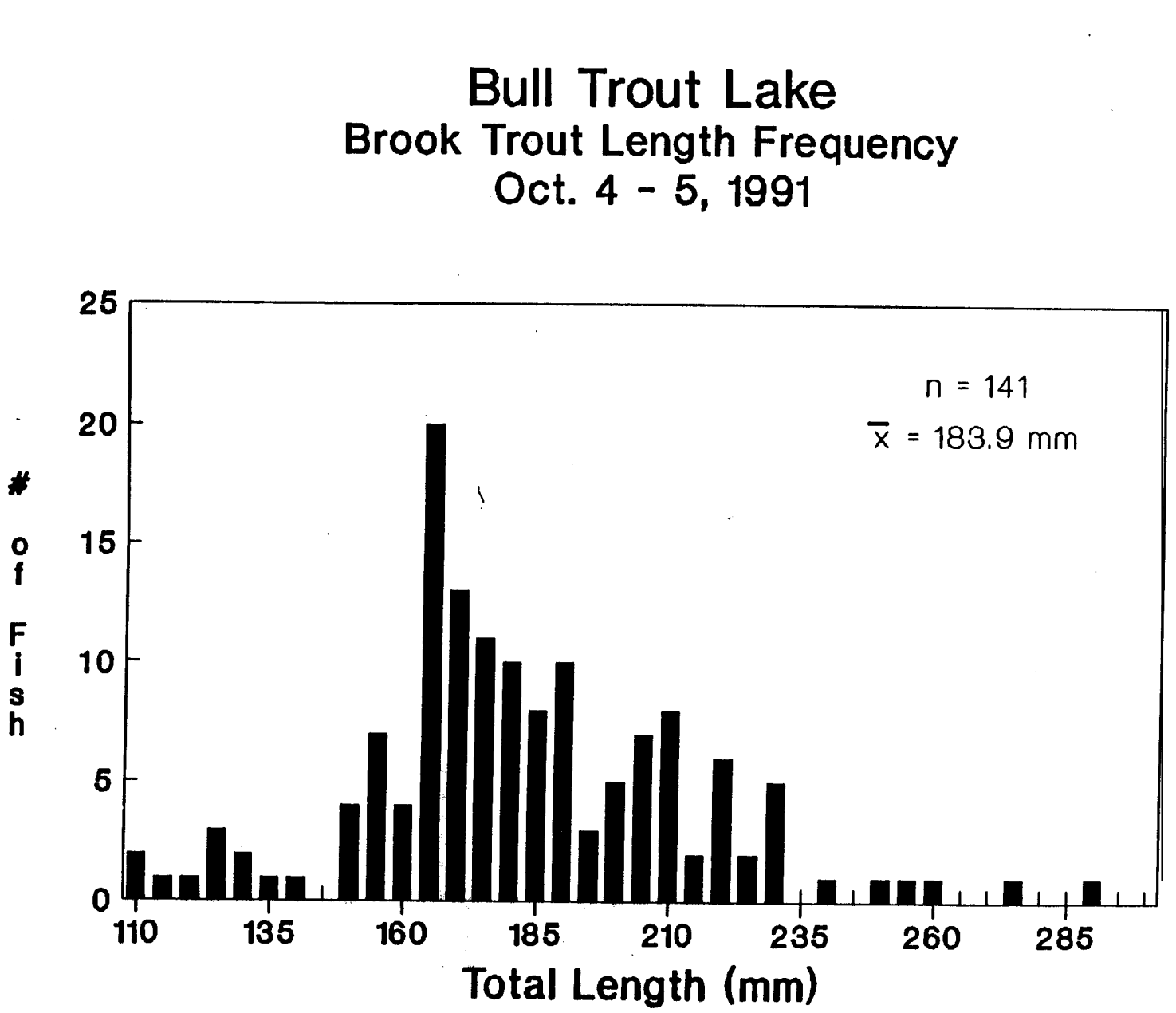


Figure 2. Length frequency distribution of brook trout captured at Bull Trout Lake, October 1991.

Table 3. Frequency of marked largemouth bass recaptured during fishing tournaments at C.J. Strike Reservoir in 1991.

Tournament Date	Total Captured	Total Marked[1]
6/ 1	2	0
6/ 2	2	1
6/15	21	11
6/16	2	2
9/28	4	3
TOTAL	31	17

[1] Bass were marked using a maxillary clip.

In the early spring of 1991, Idaho Power Company drew the reservoir elevation down to 2,445 ft to improve boat launching facilities. This unusual drawdown afforded an opportunity to assess the quality of habitat in the littoral areas of the reservoir. The shoal areas were almost completely devoid of rooted aquatic vegetation, with the exception of interstitial spaces in rock slide areas, some cattails in shallow coves, and deposited stumps and logs at a few creek mouths. There was no cover for juvenile fish. This lack of cover is believed to be a limiting factor for largemouth bass and bluegill Lepomis macrochirus production. Abundant crayfish Cambarus spp. and carp Cyprinus carpio populations, as well as wave and ice action, are probably adversely influencing rooted aquatic vegetation.

Placement of Christmas trees and tire structures to improve juvenile cover has not been effective, due to ice and wind action tearing structures away from moorings and scattering the material in deeper water. Christmas trees also decompose rapidly.

Idaho Power biologists have been very active in collecting fish population data. They have also tagged 91 white sturgeon Acipenser transmontanus in the upper portions of the reservoir. The catch-and-release sturgeon fishery in the upper portion of the Snake River arm has increased in popularity.

Cove Arm and Crane Falls Lakes

Water quality monitoring was conducted during April, July, and October in Cove Arm and Crane Falls lakes during 1991 (Table 4). Both bodies of water are impoundments created by water backed up by C.J. Strike Reservoir and are located within one mile of each other.

Over the past several years, cold water species of fish do not appear to survive over winter in Crane Falls Lake. High alkalinity and reduced dissolved oxygen levels during ice cover are suspected to be major stressors contributing to mortality.

Crane Falls Lake remained stratified into November, while Cove Arm Lake mixing occurred at least six weeks earlier.

Historically, a six-week spring pumping program has been conducted to reduce available spawning habitat for bluegill in Crane Falls and to improve water quality. The length of spring pumping has been too effective, removing bluegill reproduction. In the future, Crane Falls Lake will also be pumped for about one week, on a quarterly basis, to improve water turnover rates.

Table 4. Water chemistry monitoring results from Crane Falls Lake and Cove Arm Lake during 1991.

Date	Temp. (°C)	Hardness (mg/1)	pH	Alkalinity (mg/1 $CaCO_3$)	Cond. (ms)	Secchi Disk (M)
			Crane Falls Lake			
4/17	11.5	220	8.5	770	506	<10.0
7/18	24.0	200	8.3	385	425	8.2
10/31	7.7	220	8.0	385	476	<10.0
			Cove Arm Lake			
4/17	11.5	220	8.3	385	358	2.3
7/18	23.5	220	8.2	385	304	2.0
10/31	9.7	240	8.4	385	365	1.7

Deadwood Reservoir

Late summer releases of approximately 50,000 acre feet of water caused large numbers of kokanee O. nerka kennerlyi and trout to evacuate the reservoir. This loss, coupled with migration barrier weirs in the Deadwood River, Basin Creek, and Wild Buck Creek, should reverse the downward trend in the size of kokanee. Introduction of Atlantic salmon, which are preying on kokanee, should also reduce numbers and increase the size of kokanee. The Bureau of Reclamation is planning to release water from Deadwood Reservoir for the next two to three years for enhancement of salmon survival. This activity will have a detrimental effect on the fishery in the next three to five years, and that effect should be documented.

The 1991 spawning run of kokanee exceeded our objectives in numbers and was considerably below our size objective of 14-in (355 mm) mean length. Basin Creek and Wild Buck Creek were weired near their confluence with the Deadwood River, and approximately 50 spawners were released upstream of each of those weirs. The Deadwood River migration barrier was operated to eliminate all kokanee escapement above the barrier. A total of 2.1 million eggs were taken from kokanee trapped at the migration barrier. The length frequency of those kokanee trapped are displayed in Figure 3. In addition, the length frequency of fall gill net samples have shown a downward trend in size over the last three years (Figure 4).

Stomach analysis of rainbow, rainbow x cutthroat hybrids, bull trout S. confluentus, and Atlantic salmon revealed that juvenile kokanee are a major food item for the fish that were over 305 mm in length. These predators are present in adequate numbers and size (380 mm to 635 mm) to assist in reducing kokanee abundance. Westslope cutthroat O. clarki are providing an attractive fishery and are attaining lengths up to 490 mm. They are feeding primarily on aquatic insects and have excellent condition factors.

The Deadwood River downstream from the migration barrier and Trail Creek supported the majority of natural spawning of kokanee in 1991. A temporary weir should be installed in the lower portion of Trail Creek to control the number of spawners using that stream in 1992.

Over the next three- to five-year period, it will be difficult to balance kokanee escapement, predator inertia, and evacuation of water and fish during the anadromous fish flow/velocity releases. It is predicted that kokanee abundance will decline and kokanee size will increase in the near future.

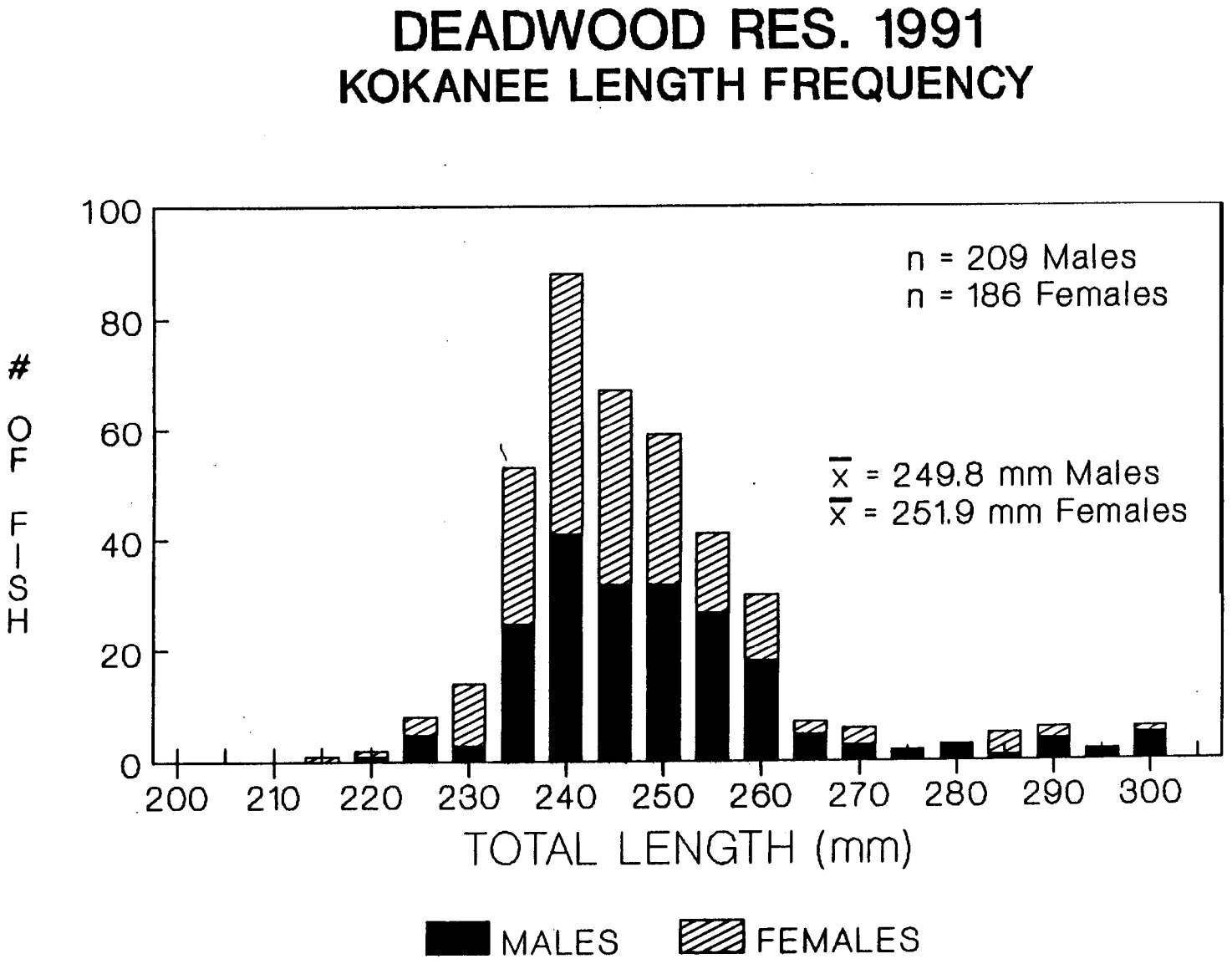


Figure 3. Length frequency of spawning kokanee collected from Deadwood Reservoir, August 1991.

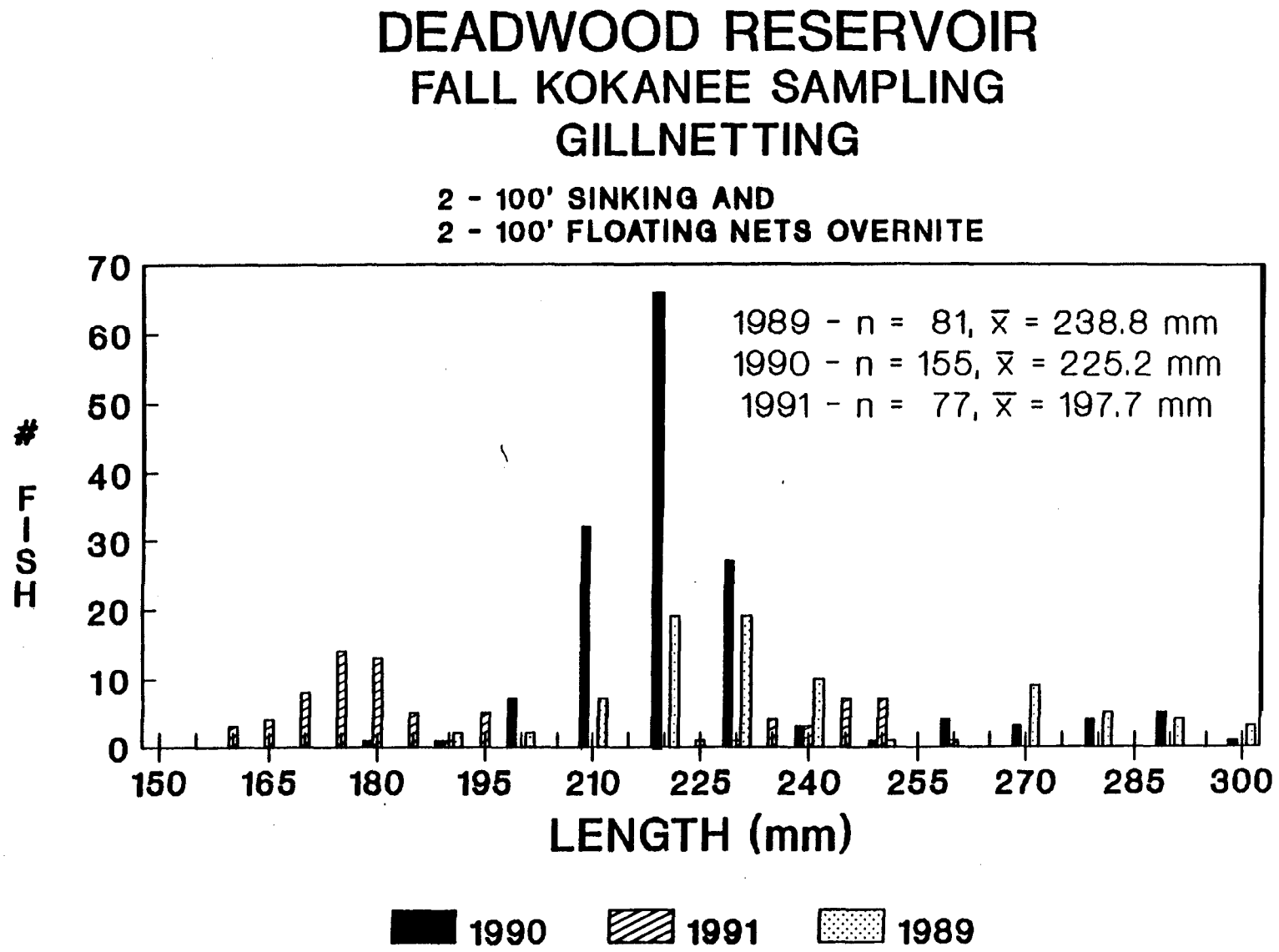


Figure 4. Length frequency of kokanee collected in fall gill nets at Deadwood Reservoir, 1989 to 1991.

Secchi disk readings, taken periodically during the summer months, ranged from 4 m to 5 m, indicating that Deadwood Reservoir is above-average in productivity for Idaho kokanee waters. The growth rates of other salmonids would also indicate an above-average productivity level.

Every effort should be made to avoid late summer storage evacuation. This reservoir has the potential of being one of the best fisheries in the state.

Lake Lowell

The extended low reservoir elevation necessitated by the dam reconstruction project in late 1990 and early 1991, coupled with an extended period of cold weather, resulted in a partial fish kill during the winter. Some dead fish were found after the ice melted and April electrofishing samples revealed that a major proportion of the largemouth bass were no longer present in the population (Figure 5). Other game fish species, such as rainbow trout, Lahontan cutthroat trout O. clarki henshawi, bluegill, yellow perch Perca flavescens, and brown bullhead Ameiurus nebulosus also were not present in normal numbers. Nongame fish also were affected by the fish kill.

An emergency closure to the taking of bass from Lake Lowell was implemented in June 1991. In addition, the biennial fishing regulations for 1992 and 1993 closed Lake Lowell to the taking of bass.

IDFG and local bass clubs collected largemouth bass and bluegill of all age classes and put them in Lake Lowell, in the summer, to assist in the recovery of the fishery. The bass were marked with a maxillary clip. In August, electrofishing samples of the lake resulted in 55 largemouth bass collected, of which 47 were marked. The mark and recapture estimate for the residual population of bass was 352 (Figure 6).

No prior year estimate is available for comparison, but sampling at standard electrofishing stations (Figure 7) indicates that major losses of bass and black crappie occurred.

The angling public has been very supportive of protective measures and restrictive regulations for Lake Lowell.

The trap on the Lowline Canal was not operated in 1991, but a fish salvage effort in the fall transferred large numbers of crappie, bluegill, and channel catfish from the dewatered canal back into Lake Lowell.

Lucky Peak Reservoir

Anglers expended an estimated 162,505 hours of effort (141 h/hectare or 57 h/acre) at Lucky Peak Reservoir from November 1, 1990 to October 2, 1991 (Table 5). The majority of the pressure (60%) occurred in the winter and spring time periods, while other recreational activities seemed to displace anglers through the summer periods. Bank and boat anglers comprised 57.1 percent and 39.3 percent of the total effort, respectively (Table 6); while ice anglers (3.2%) and float-tube anglers (0.4%) comprised a minor portion of the angling hours.

The interval of August 8 through September 4 received the highest effort (25,880 h) and produced the lowest harvest rate. In past years, Lucky Peak Reservoir has produced excellent fall trout fishing; but, during the falls of 1990 and 1991, extremely low water conditions, due to continuing drought, made angler access difficult and large numbers of fish were passed out of the reservoir.

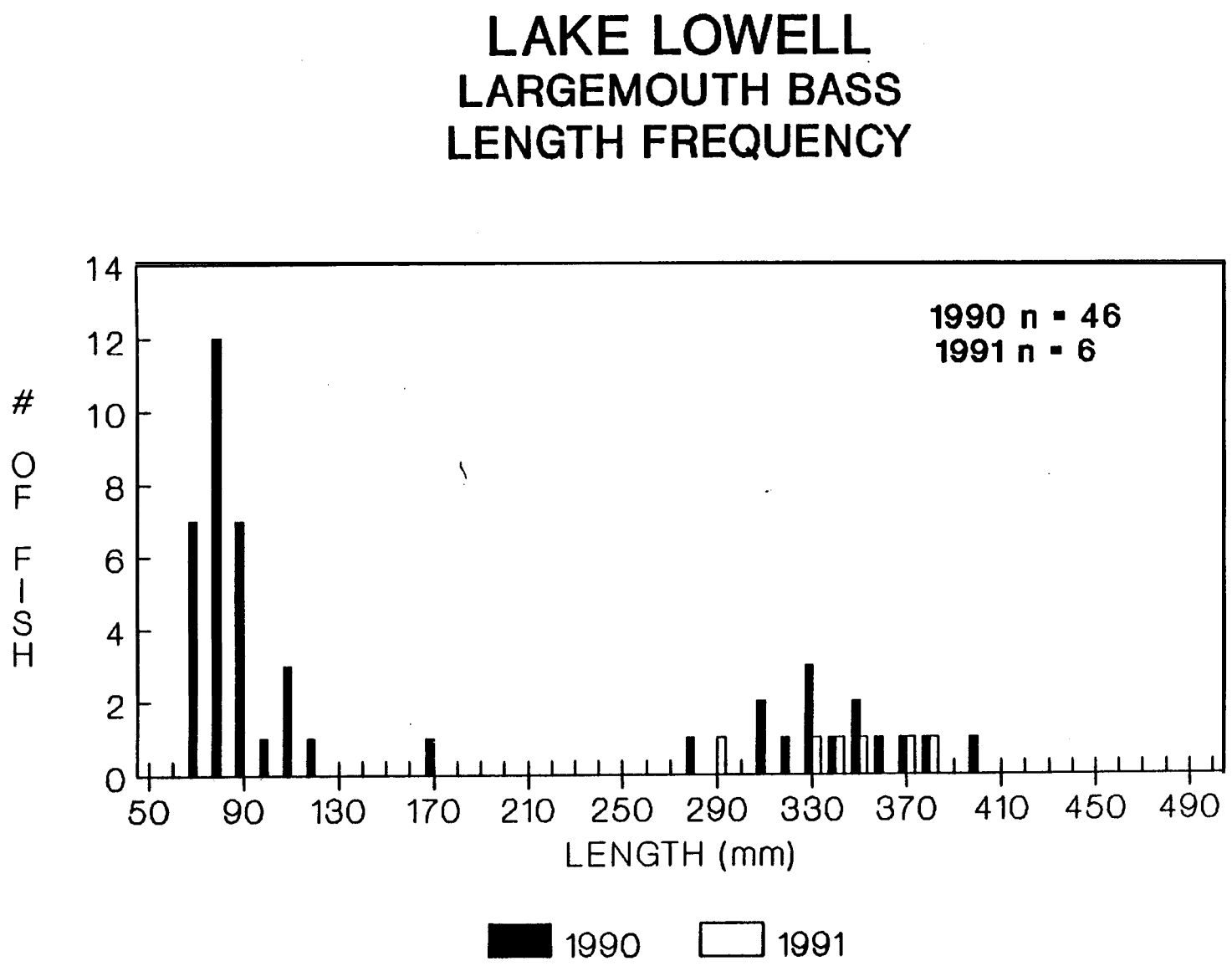


Figure 5. Length frequency of largemouth bass collected from identical shoreline transects in Lake Lowell, May 1990 and 1991.

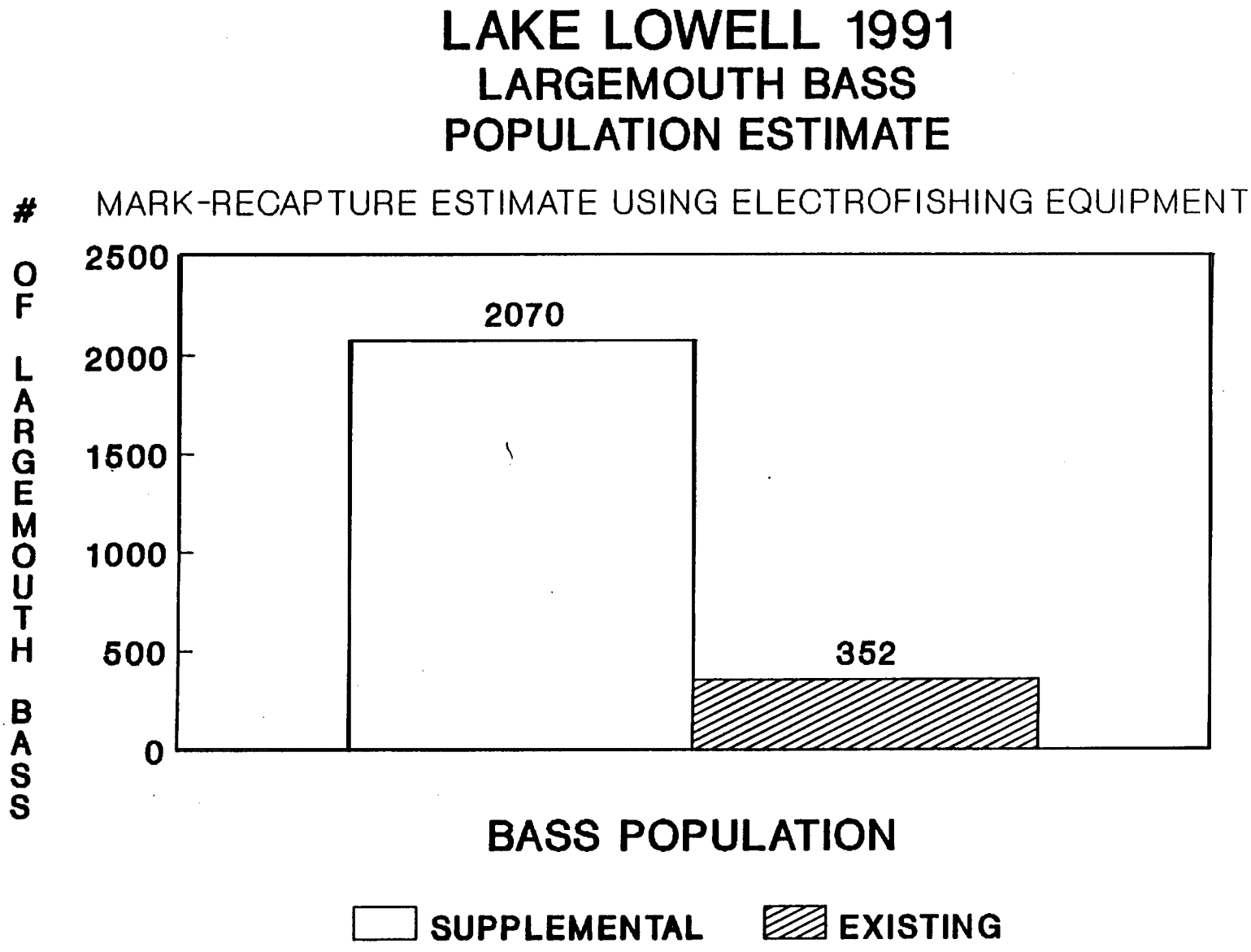
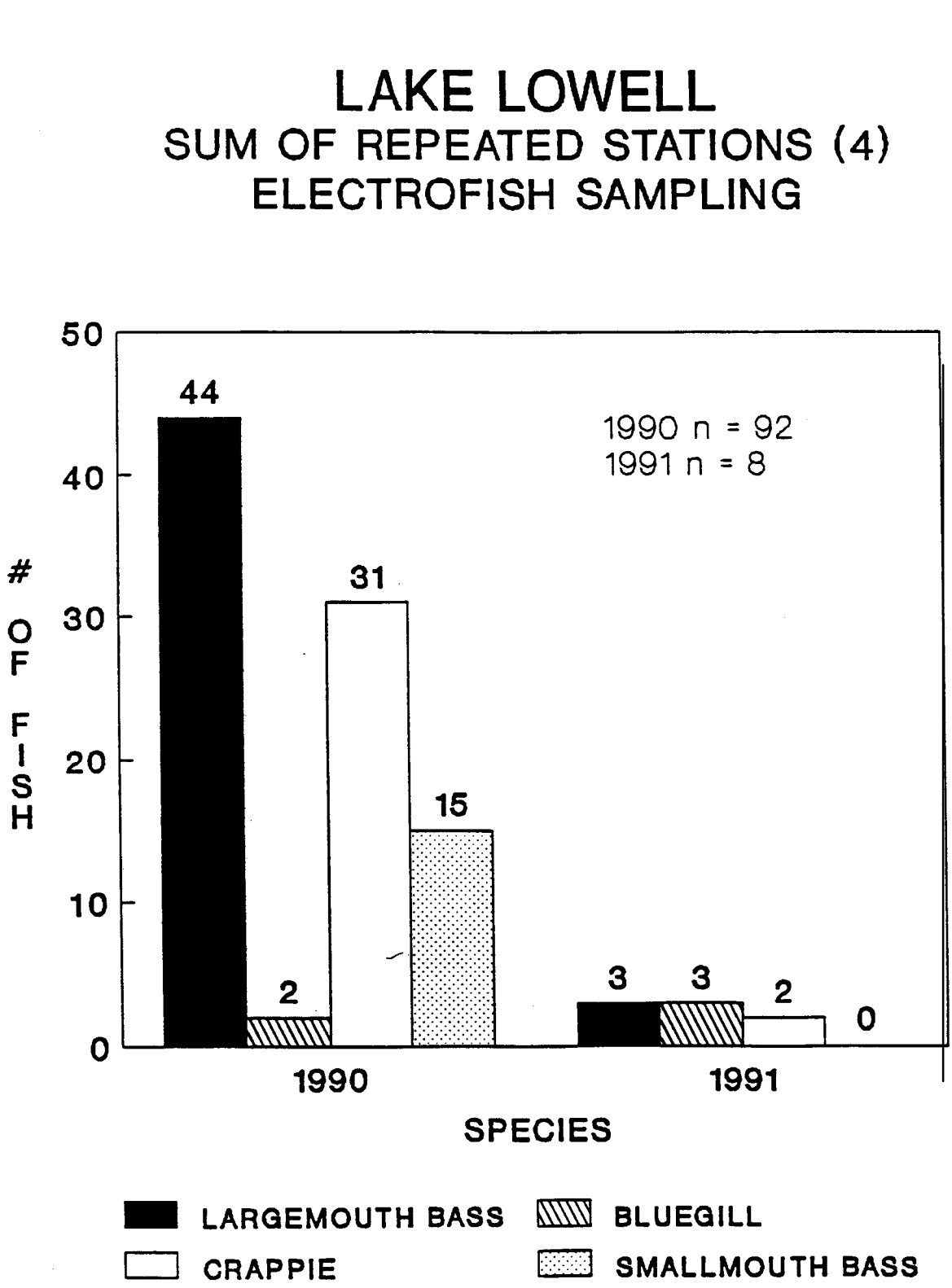


Figure 6. Mark and recapture population estimates of largemouth bass in Lake Lowell, August 1991.



Only adult bluegill and crappie represented.

Figure 7. Summary of game fish collected from established sampling transects at Lake Lowell, May 1990 and 1991.

Table 5. Summary of fishery statistics collected during a roving creel survey performed at Lucky Peak Reservoir from November 1, 1990 through October 1, 1991. (Data are the interval sample totals ± 95% confidence limits [CL] in parentheses. A total of 49 weekdays and 46 weekend days were sampled.)

Interval	Effort (h) ±95% CL		Harvest Rate (fish/h)	Total Harvest[1] (number) ±95% CL	
Nov 1 - Nov 28	10,328	(3,674)	0,34	3,535	(2,044)
Nov 29 - Dec 26	3,531	(1,462)	0,17	592	(647)
Dec 27 - Jan 23	3,095	(1,167)	0,46	1,433	(853)
Jan 24 - Feb 20	6,734	(3,892)	0,29	1,975	(1,294)
Feb 21 - Mar 20	16,360	(3,973)	0,32	5,182	(4,074)
Mar 21 - Apr 17	16,505	(3,673)	0,31	5,073	(2,674)
Apr 18 - May 15	23,460	(7,226)	0,20	4,769	(2,300)
May 16 - Jun 12	16,592	(5,302)	0,18	3,032	(2,093)
Jun 13 - Jul 10	21,974	(3,313)	0,36	8,126	(5,126)
Jul 11 - Aug 7	8,713	(1,715)	0,24	2,137	(1,718)
Aug 8 - Sep 4	25,880	(5,971)	0,06	1,774	(946)
Sep 5 - Oct 2	9,333	(1,8601	1,30	12,144	(11,113)
Totals	162,505	(13,957)	0,31	49,772	(13,931)

[1] Only game fish are included in the estimates.

Table 6. Effort (h) expended by boat and bank anglers at Lucky Peak Reservoir from November 1, 1990 through October 2, 1991. (Data are the interval sample totals ± 95% confidence limits (CL] in parentheses.)

Interval	Boat Anglers ± CL		Bank Anglers ± CL		Total[1] Anglers ± CL	
Nov 1 - Nov 28	857	(426)	9,471	(3,650)	10,328	(3,674)
Nov 29 - Dec 26	61	(70)	3,470	(1,460)	3,531	(1,462)
Dec 27 - Jan 23	0	(0)	716	(636)	3,095	(1,167)
Jan 24 - Feb 20	81	(161)	3,792	(2,957)	6,734	(3,892)
Feb 21 - Mar 20	2,367	(894)	13,993	(3,871)	16,360	(3,973)
Mar 21 - Apr 17	5,515	(2,011)	10,945	(3,073)	16,505	(3,673)
Apr 18 - May 15	12,024	(4,763)	11,212	(5,431)	23,460	(7,226)
May 16 - Jun 12	8,309	(3,216)	8,202	(4,213)	16,592	(5,302)
Jun 13 - Jul 10	11,307	(3,079)	10,528	(1,212)	21,974	(3,313)
Jul 11 - Aug 7	5,785	(1,574)	2,921	(679)	8,713	(1,715)
Aug 8 - Sep 4	14,105	(4,560)	11,775	(3,855)	25,880	(5,971)
Sep 5 - Oct 2	3,522	(1,020)	5,777	(1,5541	9,333	(1,860)
Totals	63,933	(8,479)	92,802	(10,747)	162,505	(13,957)

[1] Includes 5,240 (2,708) ice anglers from January 27, 1991 to February 20, 1991 and 530 (271) float tube anglers.

Nearly 42,000 game fish were estimated in the harvest during the 11-month creel census period at Lucky Peak (Table 7). Rainbow trout were the predominant species caught, with kokanee and yellow perch following (Table 8). Rainbow trout stocked at a length of 200 mm or greater contributed 68.5 percent of the total harvest, while trout stocked at less than 200 mm contributed 22 percent of the harvest. Roughly 45,000 trout, which were stocked at 200 mm and larger, yielded a harvest of 28,691, suggesting a numerical return rate of just over 60 percent. Nearly 350,000 trout stocked at less than 200 mm, with a total weight of 6,300 pounds, yielded a harvest of 9,194 fish. While no weights were taken from creeled fish, if they averaged two-thirds of a pound, this put-grow-and-take program would meet the minimum goal of 100 percent return by weight.

Table 7. Estimates of harvest (numbers) per fish species for anglers at Lucky Peak Reservoir from November 1, 1990 to October 2, 1991. (Estimates based on proportions observed during angler interviews with appropriate 95% confidence limits [CL] in parentheses.)

Interval	Total Harvest (numbers) t 95 % CL									
	Catchable Stocked Rainbow Trout		Fingerling Stocked Rainbow Trout		Smallmouth Bass		Kokanee		Yellow Perch	
Nov 1 - Nov 28	3,535	(2,044)	-		-		-		-	
Nov 29 Dec 26	465	(549)	127	(242)	-		-		-	
Dec 27 Jan 23	1,309	(801)	124	(119)	-		-		-	
Jan 24 Feb 20	1,310	(973)	629	(649)	-		-		36	(77)
Feb 21 Mar 20	2,541	(2,552)	2,571	(2,038	-		79	(181)	-	
Mar 21 Apr 17	2,787	(2,050)	1,967	(1,269	-		19	(5)	42	(78)
Apr 18 May 15	2,677	(1,601)	1,467	(1,231)	-		273	(565)	78	(155)
May 16 Jun 12	1,585	(1,713)	678	(473)	-		600	(740)	-	
Jun 13 Jul 10	1,950	(1,432)	408	(552)	-		735	(616)	120	(232)
Jul 11 Aug 7	73	(114)	174	(183)	-		238	(148)	-	
Aug 8 - Sep 4	44	(71)	265	(329)	88	(187)	518	(627)	88	(187
Sep 5 - Oct 2	10,41	(10,985)	784	(1,707	-		920	(1,4631	22	(39)
Totals	28,69	(12,043)	9,194	(3,371)	88	(187)	3,530	(1,994	386	(356)

Table 8. Percent of species composition of the harvest for anglers at Lucky Peak Reservoir from November 1, 1990 through October 2, 1991.

Interval	Percent of Composition				
	Catchable Stocked Rainbow Trout	Fingerling Stocked Rainbow Trout	Smallmouth Bass	Kokanee	Yellow Perch
Nov 1 - Nov 28	100.0	-	-	-	-
Nov 29 - Dec 26	78.5	21.5	-	-	-
Dec 27 - Jan 23	91.3	8.7	-	-	-
Jan 24 - Feb 20	66.3	31.8	-	-	1.9
Feb 21 - Mar 20	48.9	49.5	-	1.6	-
Mar 21 - Apr 17	57.8	40.8	-	0.4	1.0
Apr 18 - May 15	59.5	32.6	-	6.2	1.7
May 16 - Jun 12	55.4	23.7	-	20.9	-
Jun 13 - Jul 10	59.9	12.7	-	22.8	3.6
Jul 11 Aug 7	15.1	35.9	-	49.0	-
Aug 8 - Sep 4	4.4	26.4	8.7	51.6	8.6
Sep 5 - Oct 2	85.8	6.5	-	7.6	0.1
Percent of Totals	68.5	21.9	0.2	8.5	0.9

Kokanee made a major contribution to the harvest from May 16 to September 4, 1991. After September 4, low water levels made boat launch facilities unusable, thus reducing kokanee harvest. Numerous reports in the local press of kokanee from 350 mm to 480 mm increased the number of anglers specifically targeting kokanee later in the summer months.

Secchi disk measurements taken throughout the spring and summer months showed a mean reading of 3.03 m, which indicates above-normal productivity, compared to other Idaho waters stocked with kokanee (B. Rieman, personal communication). The late spawning kokanee program should be continued, not only from a biological standpoint, but also from the extremely positive public relations aspect.

Owyhee County Reservoir Development

Feasibility work concentrated on the following four sites in 1991: Lower Castle Creek; Sinker Creek; Spencer Reservoir (reconstruction); and Upper Jump Creek.

High arsenic levels (34 ppb) in Castle Creek and relatively high costs appear to be constraining factors on the Lower Castle Creek site.

Sinker Creek water supplies and water quality are suitable, and it is recommended that core drilling at the dam site be conducted to further evaluate feasibility.

Spencer Reservoir also has a higher than normal arsenic level (16 ppb). The raising of this existing dam does appear to be feasible and could be accomplished at a modest cost. Core drilling and materials sampling should be initiated to allow design and cost estimates to be completed. The Owyhee County Highway District will provide a new bridge span across the new spillway at their cost. The owner of the dam and the existing storage rights will provide materials, water rights, and sportsman access for this project.

Upper Jump Creek water flows are not adequate for filling the desired reservoir volume, and it is recommended that this site be dropped from future consideration.

The Bureau of Reclamation is a cooperator in this project, and has approximately $75,000 for feasibility analysis and design for an Owyhee Reservoir fishery enhancement project.

It is recommended that a site be selected in 1992 for design and cost estimates to be completed.

Drought Impacts

Paddock Reservoir

Paddock Reservoir was drawn down to dead storage by irrigation demand in 1990 and 1991. All active storage was gone in July of 1991 and evaporation and heat caused a complete fish kill in the upper basin. Fish survived in the smaller lower basin. Restocking of black crappie, bluegill, and largemouth bass will be necessary to achieve a quick recovery in this popular fishery, and restocking will be accomplished as soon as water conditions allow.

Succor Creek Reservoir

For the second year in succession, the reservoir was reduced to a flowing stream. One hundred eight redband trout were removed and placed in a private pond in the Willow Creek drainage for possible brood stock.

Mountain Home Reservoir

For the third consecutive year, Mountain Home Reservoir was reduced to a mud flat. Few smallmouth bass and wild rainbow trout were lost.

Crane Creek Reservoir

For the third consecutive year, Crane Creek Reservoir was reduced to minimum level late in the irrigation season. Largemouth bass, bluegill, brown bullhead, white crappie, and Lahonton cutthroat trout were lost.

Indian Creek Reservoir

For the fifth consecutive year, water levels receded in Indian Creek Reservoir. Loss of cover habitat due to decreasing shoreline has adversely affected a popular bluegill and largemouth bass fishery. Extreme temperatures, coupled with decreased volume, appear to have reduced or eliminated the over-wintering of trout species.

Arrowrock and Lucky Peak Reservoirs

Both Boise River impoundments were reduced to minimum levels during the fall of 1991. Significant losses of salmonid species, especially from Lucky Peak Reservoir, will have a detrimental impact on this popular fishery for several years to come.

Fish losses from Lucky Peak Reservoir were documented and a mitigation settlement was negotiated with Seattle Power and Light for present and future losses.

Fishing Tournaments

A total of 54 applications to conduct fishing tournaments were submitted for the Region 3 (Nampa) area during 1991. C.J. Strike Reservoir was the most popular destination, with 22 tournaments, followed by Brownlee Reservoir and Lucky Peak Reservoir, with 12 and 7 tournaments, respectively. The majority of the tournaments are catch-and-release for largemouth and smallmouth bass.

A summary of individual tournament results can be obtained from IDFG Fisheries Bureau.

Fishing Brochures

Aquatic Education funding for angler guides was made available from a number of sources during 1991. Fishing brochures for the Boise urban area, C.J. Strike Reservoir, and the Washington-Payette counties area were produced, with publication scheduled for 1992.

Miscellaneous Spot Creel Checks

Region 3 personnel collected spot creel survey data at 16 lowland lakes and reservoirs during 1991 for 13 game fish species (Appendix 1).

RECOMMENDATIONS

1. Continue to monitor smallmouth and largemouth bass populations and fisheries to assess the status and need to consider alternative management strategies.
2. Monitor and restrict, when necessary, kokanee populations in Deadwood and Lucky Peak reservoirs annually to assess size structure and natural and hatchery recruitment.
3. Evaluate effects of special Deadwood Reservoir releases on productivity and fish populations.
4. Assess the Lahontan cutthroat trout stocking program, especially in Owyhee County reservoirs, to determine year-class strength.
5. For the next several years, continue to intensively monitor all fish populations in Lake Lowell to document artificial enhancement of warmwater fish populations.
6. When possible, evaluate the return to creel of put-and-take versus put-grow-and-take rainbow trout stocking programs that occur in identical waters.
7. Continue to secure and enhance urban fishing waters, as well as new reservoir sites, with emphasis on fishing and recreation value.
8. Conduct a harvest and use study at C.J. Strike Reservoir.
9. Conduct an evaluation of sublegal and legal largemouth bass stocking in C.J. Strike Reservoir.
10. Conduct an evaluation of effectiveness of large fingerling trout stocking in C.J. Strike Reservoir.
11. Set spring gill net sets in Bull Trout Lake.

ACKNOWLEDGEMENTS

Brian Flatter, Fisheries Technician, for his valuable field assistance in collecting and monitoring largemouth bass Micropterus salmoides populations in C.J. Strike Reservoir and Lake Lowell.

The Conservation Officers in both the Payette and Boise districts for collecting invaluable creel data and assisting in field activities.

Walt Bast and the crew of the Nampa Fish Hatchery for miscellaneous assistance with manpower and equipment.

APPENDICES

Appendix 1. Miscellaneous spot creel data collected by Region 3 personnel at lowland lakes and reservoirs in 1991.

No. of Anctlers	Hours Fished	Rainbow Trout Hatchery/Wild		Cutthroat Trout	Bull Trout	White Fish	Kokanee	LM Bass	SM Bass	Blue Gill	Crappie	Yellow Perch	Bull Head	Channel Catfish
ARROWROCK RESERVOIR														
86	183.5	12	7	0	5	0	0	0	2	0	0	0	0	0
BLACK CANYON RESERVOIR														
44	22.0	12	0	0	0	0	0	0	0	0	0	0	0	10
BROWNLEE RESERVOIR														
206	805.5	0	0	0	0	0	0	0	35	7	263	3	1	291
C.J. STRIKE RESERVOIR														
(see report)		0	0	0	0	0	0	0	0	0	0	0	0	0
CALDWELL PONDS														
119	177.5	25	0	0	0	0	0	0	4	33	1	0	27	0
DEADWOOD RESERVOIR														
41	125.0	0	1	22	1	0	206	0	0	0	0	0	0	0
DUFF LANE POND														
10	21.0	0	0	0	0	0	0	3	0	2	0	0	3	0
EMMETT AIRPORT POND														
14	16.5	0	0	0	0	0	0	2	0	50	0	0	0	0
HORSESHOE BEND POND														
56	85.5	23	0	0	0	0	0	0	0	49	0	0	5	0
INDIAN CREEK RESERVOIR														
25	57.5	11	0	0	0	0	0	0	0	0	3	0	0	0
LAKE LOWELL														
82	158.5	6	0	0	0	0	0	0	0	1	0	0	18	7
LUCKY PEAK														
69	152.5	20	0	0	0	1	11	0	27	0	0	0	0	0
MARSING POND														
94	167.5	71	0	0	0	0	0	0	0	1	0	0	0	0
PARKCENTER POND														
8	12.5	7	0	0	0	0	0	0	0	0	0	0	0	0
RIVERSIDE POND														
13	21.5	4	0	0	0	0	0	2	0	0	1	0	0	0
SAWYER'S POND														
48	87.5	28	0	0	0	0	0	0	0	6	0	0	0	15
STAR LANE PONDS														
9	27.0	14	0	0	0	0	0	0	0	23	0	0	0	0
VETERANS POND														
25	52.5	30	0	0	0	0	0	1	0	2	0	0	0	0
WILSON PONDS														
107	162.5	53	0	0	0	0	0	0	0	0	0	0	0	0

JOB PERFORMANCE REPORT

State of:	**Idaho**	**Name:**	**Regional Fishery Management Investigations**
Project No.:	**F-71-R-16**	**Title:**	**Region 3 (Nampa) Rivers and Streams Investigations**
Job No.:	**3-c**		

Period Covered: July 1. 1991 to June 30. 1992

ABSTRACT

Modification of the Bear Valley Creek grazing allotment was approved and will be implemented in 1992. With assistance from the Boise Valley Fly Fishermen, willow planting and placement of bank stabilization structures in Bear Valley Creek, from Poker Meadows to Elk Creek, was accomplished to improve the riparian corridor.

North Fork Owyhee River and Juniper Creek were sampled for baseline data collection. Densities of trout were less than 0.5 fish/100 m' at all collection sites.

The collapse of the Atlanta Dam on the Middle Fork of the Boise River released approximately 200,000 cubic yards of material, most of which settled in a 5- to 8-mile section, immediately below the dam site.

Authors:

Scott Grunder
Regional Fishery Biologist

David Parrish
Fishery Technician

OBJECTIVES

To maintain information for fishery management activities and decisions for rivers and streams.

INTRODUCTION

Fishery management personnel typically perform, as part of their overall duties, a variety of activities on rivers and streams on an annual basis to gather information for improving fishing opportunities. This section of the report summarizes fishery management activities performed in 1991 at rivers and streams.

METHODS

Region 3 (Nampa) fishery personnel sampled river and stream fisheries using electrofishing gear and snorkeling techniques. Physical habitat information was collected at stream reaches where appropriate.

RESULTS

Bear Valley Creek

The new allotment management plan for cattle grazing along Bear Valley Creek was approved in 1991 and will be implemented in 1992. The plan calls for differential grazing rates in the riparian zone and uplands. Riparian pastures will be grazed for approximately three weeks in the earliest part of the grazing season to achieve a minimum of a 6-in stubble height for greenline vegetation (sedges and grasses). The Idaho Department of Fish and Game (IDFG) has been concerned about restoration of a strong willow component and the ability of the USFS and permittees to graze riparian areas for any period of time and simultaneously achieve a rapid recovery of riparian vegetation, including newly planted willow starts.

In June of 1991, IDFG initiated a cooperative project with the Boise Valley Fly Fishermen to plant willow starts along both banks of Bear Valley Creek from Poker Meadows Bridge downstream to Fir Creek Pack Bridge. The Elk Creek allotment permittee did an excellent job of herding the cattle away from this area during the summer of 1991 and the majority of the willows obtained an excellent start. In the fall of 1991, cattle were allowed into this area and in a short period of time significantly damaged the willow shoots.

IDFG will cooperate with USFS in monitoring the effectiveness of the changes in grazing management over the next several years. Additional monitoring data will also be needed for the Endangered Species Act recovery plan.

North Fork Owyhee River and Tributaries

Emphasis on the collection of baseline fish population and habitat data from the Owyhee River drainage was escalated in 1991 due to the proposed Big Spring bombing range.

Due to limited access and rugged terrain, transects were established in the Owyhee River drainage. Specific locations are on file in the regional office.

Densities of trout were light throughout the North Fork Owyhee River sample area with no densities of trout exceeding 0.5 fish/100 m^2 (Table 2). Poor riparian grazing practices had removed an estimated 70 percent of all vegetation from stream banks, which has resulted in degraded habitat (Tables 1 and 3).

Table 1. Estimated percent of composition of habitat by type for sections of the North Fork Owyhee River drainage in 1991.

Water	Section	Percent of Habitat by Type				
		Pool	Run	Pocket Water	Riffle	Backwater
North Fork Owyhee River	1	0	50	6	22	22
North Fork Owyhee River	2	33	28	0	33	0
North Fork Owyhee River	3	0	40	0	53	7
Juniper Creek	1	0	17	0	75	8
Juniper Creek	2	0	17	8	75	0

On Juniper Creek, fish densities were approximately six times higher inside of the riparian exclosure.

Further baseline data will be collected during the next field season.

Middle Fork Boise River - Atlanta Dam

On May 28, the Atlanta Dam (Kirby Dam) collapsed sending approximately 200,000 cubic yards of accumulated sediment into the Middle Fork Boise River system. The majority of material settled within 5 to 8 miles of the dam with some fine materials carrying as far as Lucky Peak Reservoir. IDFG personnel collected fish samples for the Idaho Department of Health and Welfare for testing for arsenic and mercury. Unhealthful levels of both heavy metals were found in samples and a health alert was issued for the entire Middle Fork Boise River.

Two to three years will be allowed to pass for the river and fish populations to stabilize, before fish population and habitat assessment will be conducted in the upper Middle Fork Boise River drainage.

Miscellaneous Spot Creel Checks

Region 3 personnel collected spot creel survey data at 11 rivers and streams during 1991 (Appendix 1).

Table 2. Densities of wild rainbow trout observed per section in the North Fork Owyhee River drainage using electrofishing gear in 1991.

Water	Section	Location	Section Area (m^2)	Wild Rainbow Trout Densities (no./100 m^2) 0-4	5-9	9-12 in.	>12 in.	Total
North Fork Owyhee River	1	Below mouth of Juniper Creek (Twp.9S,Rge.5W,Sec.29,SE1/4SE1/4)	762.4	0.00	0.26	0.00	0.00	0.26
North Fork Owyhee River	2	Above North Fork Crossing (Twp.9S,Rge.SW,Sec.31,SW1/4SW1/4)	653.0	0.00	0.15	0.00	0.00	0.15
North Fork Owyhee River	3	Below North Fork Crossing (Twp.9S,Rge.6W,Sec.36,SE1/4SE1/4)	498.0	0.00	0.20	0.00	0.20	0.40
Juniper Creek	1	Above BLM Exciosure (Twp.9S,Rge.5W,Sec.21,NE1/4SW1/4)	124.0	0.80	0.80	0.00	0.00	1.60
Juniper Creek	2	BLM Exclosure (Twp.9S,Rge.5W,Sec.21,NE1/4SW1/4)	262.0	1.60	7.20	0.00	0.00	8.80

Other species collected: Other species collected: redside shiner; speckled dace; longnose dace; bridgelip sucker; northern squawfish; smallmouth bass; and sculpin sp.

Table 3. Summary of physical habitat data collected at sections of the North Fork Owyhee River drainage in 1991 by Idaho Department of Fish and Game personnel.

Water	Section	Channel Type	Length (m1	Water Grad. (%1	Temp. (°C1	Mean Depth (m1	Percent of Substrate by Class Sand	Gravel	Rubble	Boulder	Bedrock
North Fork Owyhee River	1	F	117.3	0.003	24.4	0.19	34	13	14	39	0
North Fork Owyhee River	2	F	64.7	0.007	18.3	0.26	29	14	41	16	0
North Fork Owyhee River	3	F	65.5	0.007	18.3	0.19	23	22	37	18	0
Juniper Creek	1	B	56.2	0.021	6.8	0.12	17	28	48	7	0
Juniper Creek	2	B	90.2	0.011	6.8	0.20	24	6	47	23	0

RECOMMENDATIONS

1. Establish an inventory of rivers and streams which contain bull trout Salvelinus confluentus.
2. Continue to monitor the Middle Fork of the Boise River to assess impacts of the Atlanta Dam failure.
3. Continue to collect baseline data on Owyhee County river and stream systems.
4. Establish transects on the Middle Fork Payette River above the end of the road.

ACKNOWLEDGEMENTS

The Conservation Officers in both the Payette and Boise districts for collecting invaluable creel data and assisting in field activities.

Walt Rast and the crew of the Nampa Fish Hatchery for miscellaneous assistance with manpower and equipment.

A P P E N D I C E S

Appendix 1. Miscellaneous spot creel data collected by Region 3 personnel at rivers and streams during 1991.

No. of Anglers	Hours Fished	Rainbow Trout Hatchery	Rainbow Trout Wild	Cutthroat Trout	Bull Trout	White Fish	Kokanee	LM Bass	SM Bass	Blue Gill	Crappie	Yellow Perch	Bull Head	Channel Catfish
Boise River														
218	305.0	60	0	0	0	6	0	0	0	10	0	0	4	0
Boise River (Special Regulations)														
17	16.0	5	0	0	0	0	0	0	0	0	0	0	0	0
Middle Fork Boise River														
49	75.5	37	20	0	1	3	0	0	0	0	0	0	0	0
North Fork Boise River														
23	35.5	0	44	0	0	0	0	0	0	0	0	0	0	0
Deadwood River														
4	10.0	0	1	1	0	4	0	0	0	0	0	0	0	0
Flint Creek														
0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jordan Creek														
4	3.0	1	0	0	0	0	0	0	0	0	0	0	0	0
Mores Creek														
7	5.5	0	0	0	0	0	0	0	0	0	0	0	0	0
Owyhee River														
4	10.0	0	7	0	0	0	0	0	0	0	0	0	0	0
Payette River														
27	29.5	1	0	0	0	1	0	0	3	0	0	0	0	1
Middle Fork Payette River														
32	33.5	10	0	0	6	1	0	0	0	0	0	0	0	0
South Fork Payette River														
78	79.0	27	53	0	0	0	0	0	0	0	0	0	0	0
North Fork Payette River														
51	44.5	0	20	0	0	15	0	0	0	0	0	0	0	0
Smith Creek														
9	14.5	0	13	26	0	0	0	0	0	0	0	0	0	0
Snake River														
542	1152.5	0	0	0	0	0	0	1	31	1	5	0	3	311
Snake River (below Swan														
39	100.5	0	0	0	0	0	0	0	22	0	0	0	0	4
Weiser River														
7	49.0	0	0	0	0	0	0	0	0	0	0	0	0	3

JOB PERFORMANCE REPORT

State of: Idaho **Name:** Regional Fishery Management Investigations

Project No.: F-71-R-16 **Title:** Region 3 (Nampa) Salmon and Steelhead Investigations

Job No.: 3-d

Period Covered: July 1, 1991 to June 30, 1992

ABSTRACT

Region 3 (Nampa) fishery personnel participated in a variety of anadromous fish field activities, including collection of redd count and parr density monitoring data. All summarized data is incorporated in a separate statewide "Salmon and Steelhead Investigations" report.

Authors:

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David Parrish
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JOB PERFORMANCE REPORT

State of: Idaho **Name:** Regional Fishery Management Investigations

Project No.: F-71-R-16 **Title:** Region 3 (Nampa) Technical Guidance

Job No.: 3-e

Period Covered: July 1. 1991 to June 30. 1992

ABSTRACT

The development activity in Region 3 continued to increase in 1991. Approximately 1,300 requests for technical review were received by the Region.

The most common requests were related to timber sales, stream alteration, and urban development in Treasure Valley communities. Regional staff were also very active in describing mitigative actions that offset unavoidable adverse impacts of various development and use of water and land-based resources. Federal agencies such as the National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, and the Bonneville Power Administration frequently called upon our knowledge of the Region's fishery and wildlife resources during the year.

Authors:

Terry Holubetz
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Scott Grunder
Environmental Staff Biologist

OBJECTIVES

To achieve the protection, mitigation, and enhancement of fish and wildlife habitat through the review of proposals to develop or alter land and water resources.

RESULTS

In an effort to reduce impacts on the Boise River, the Region developed standards for gravel removal/flood control on the lower Boise River for consideration by the Idaho Department of Water Resources and the Flood Control Districts of Canyon County. For many years, the Flood Control Districts have basically removed gravel and other obstructions from the lower river in a relatively uncontrolled fashion. We have objected to these environmentally damaging practices for years, to no avail. However, in 1991, we made significant progress in changing these practices to conform with the Stream Channel Protection Act. We reached a compromise alternative with both the districts and the Department of Water Resources, one which we believe will help protect critical habitats for fish and wildlife.

The Idaho Department of Fish and Game (IDFG) reached a mitigation agreement with Seattle Power and Light and the Boise Project Board of Control concerning annual fish mortality losses through the dam turbines at Lucky Peak. IDFG will receive an annual sum to be credited toward the Lucky Peak Reservoir fishery.

The management of Succor Creek Reservoir has been a contentious issue since the early 1980s. There is a decreed minimum conservation pool of no less than 40 ft deep, which is part of a signed right-of-way agreement between the Bureau of Land Management and the Succor Creek Water Control District, an Oregon-based group of irrigators. This conservation pool stipulation has been violated on a nearly annual basis and precludes development of a trophy redband trout Oncorhynchus spp. fishery. This is a highly productive drainage, and salvage operations conducted in the fall of 1990 and 1991 have revealed many large trout. Despite continued objections by IDFG, the Bureau of Land Management has been reluctant to pursue a workable solution to the problem. The dam needs a new outlet works, which will not require complete evacuation for inspection purposes. The Region will continue to vigorously pursue this issue until it is resolved.

Regional personnel also spent much time working on mining issues such as Nerco-DeLamar's silver/gold heap leach facility in Owyhee County. We are part of an interagency coordination group which facilitates the environmentally safe development of this mine. Issues raised during the year were expansion of the mine onto Florida Mountain, waterfowl and mule deer mortalities in the existing tailings pond, detoxification of the pond, acid mine drainage in Sullivan Gulch, and wetland mitigation. We will continue this coordination during the life of the mine.

Regional personnel participated in development of IDFG's recommendations for the proposed expansion of the U. S. Air Force's activities in Owyhee County, known as the Big Springs Bombing Range. Due to the highly sensitive biological, social, and political issues associated with this proposal, the Bureau of Program Coordination and Resource Planning took the lead role in coordinating with defense entities and the Governor's Office. IDFG played a key role in raising the awareness of all involved as to the critical importance of the proposed range for big game, upland bird, nongame, and fish species. Regional personnel provided technical assistance as needed to the Bureau. We also attended a series of public meetings in regards to this proposal in Boise, Murphy, Mountain Home, and Glenna Ferry. This coordination will continue as the proposal develops.

The Region was inundated with proposals from the Boise National Forest to offer timber for salvage sales. The drought precipitated a perceived emergency situation on the Forest due to heavy infestations by various insect and plant vectors. Salvage sale timber volumes soon replaced green timber volumes in meeting allowable sale quantities for each Forest District. The Boise National Forest has undertaken an aggressive program which put a strain on the Region's ability to respond effectively. However, we did provide suitable comments on all scoping documents in a timely manner. Comments were drafted to focus the Forest Service's attention on important issues raised during scoping, such as the potential effects of the sales on big game habitat and escape cover, vulnerability to harvest, access management, sedimentation acceleration due to land disturbing activities, and cumulative effects of timber harvest activities on fish and wildlife resources. Our comments generally have a significant impact on the scope of timber sales.

The Region received Dingell-Johnson funding for a new position to provide technical assistance to management personnel in dealing with habitat-related issues. This new position, Environmental Staff Biologist, will effectively remove the burdensome and cumbersome technical guidance activities from fishery management and allow more direct fish population management. Effects of the new position were already noticeable soon after the position became effective in mid-November of 1991. The focus of the Environmental Staff Biologist will be to provide IDFG comments and input into all terrestrial and aquatic development issues. This person will also handle the Region's responsibility for the Antidegradation Program.

The failure of the Atlanta Dam resulted in a series of requests for assistance in determining the most effective remedial action. Assessments of sediment deposition and environmental impacts were made. Some input to dam reconstruction design was provided. Fish were collected to determine arsenic levels in fish downstream from the dam site. The Idaho Department of Health and Welfare's analysis indicated that the fish were unsafe for human consumption. Sediments released from the reservoir basin after the dam failure will have long-term physical and chemical effects on the aquatic organisms of the Middle Fork Boise River.

The Boise/Treasure Valley area is undergoing rapid growth in population, and pressure to utilize stream banks, riparian zones, and stream channels for commercial and residential purposes has been on the increase. Without guidelines or standards for use of these areas, staff demands for review of development/alterations have been taxing IDFG's capabilities. In an effort to better direct project sponsors toward developing proposals that would protect fish and wildlife habitat features and require less IDFG staff time to redirect poorly conceived proposals, the guidelines and standards for gravel removal and flood channel clearance and the riparian standards for the Boise River and side channels were developed (Appendix 1).

RECOMMENDATIONS

1. Continue to provide technical fisheries input to the entities which directly manage critical fisheries habitat.

2. Continue to provide technical guidance and advice to private interests and the general public.

3. Expand efforts to educate the public about the environmental requirements for fish.

A P P E N D I C E S

Appendix 1. Riparian and aquatic development standards recommended for urban water systems for fish and wildlife benefits.

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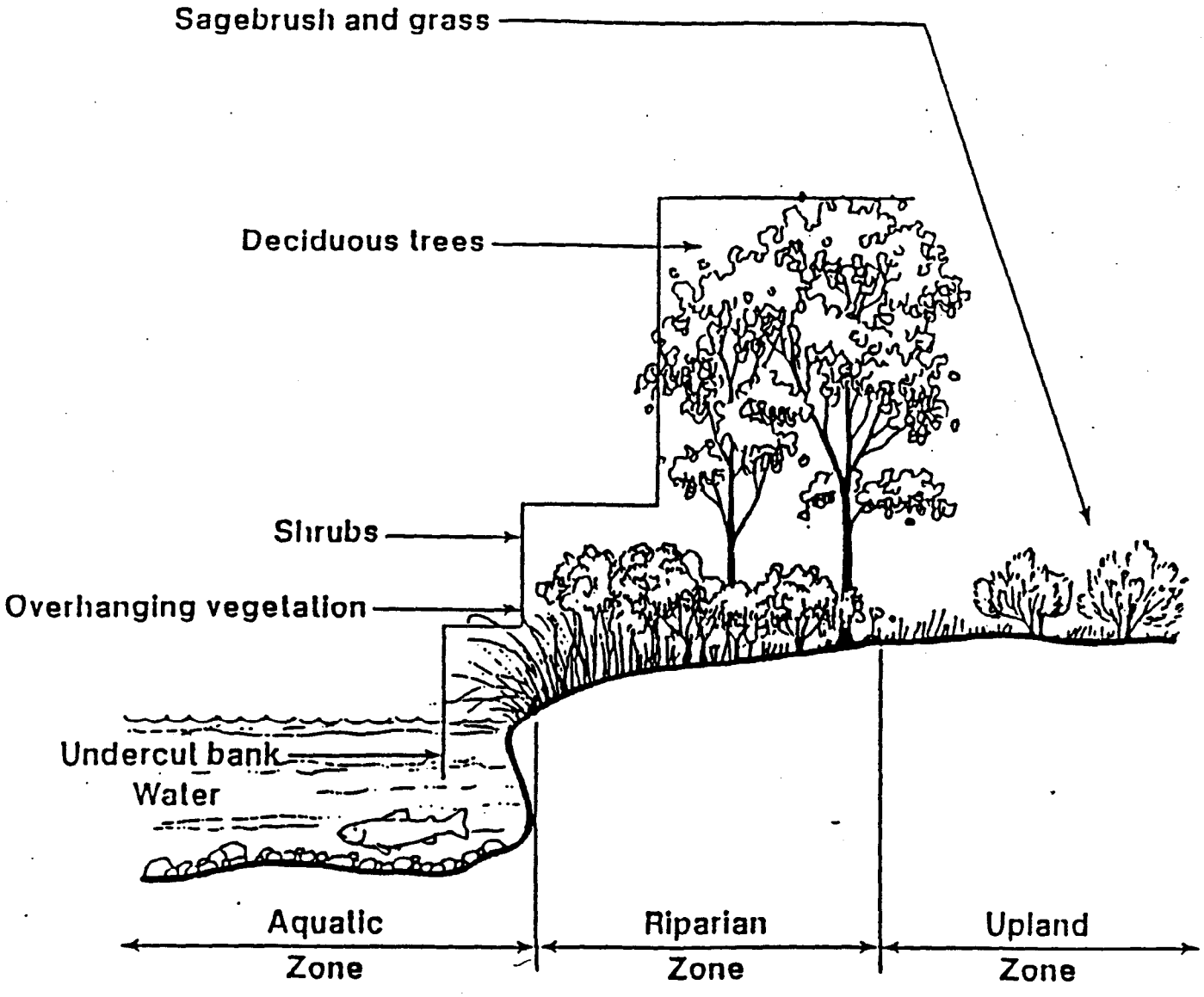
December 1991

Appendix 1. Continued.



RIPARIAN (ri-par'ē-an) adj. Most typically, this refers to lands adjacent to creeks, streams, and rivers where vegetation is strongly influenced by the presence of water.

Appendix 1. Continued.

The Idaho Department of Fish and Game (IDFG) has a vested interest in development occurring along the Boise River and elsewhere in southwestern Idaho. Currently, IDFG allows diversion of up to 40 cubic feet per second (cfs) of water from the Boise River through the Loggers Creek system during the non-irrigation season (October 15 through April 15). A total of approximately 150 cfs of water generally flows in the Boise River below Lucky Peak Dam during the non-irrigation season. This water originates from storage space in Lucky Peak Reservoir reserved for fish and wildlife. This stream maintenance flow technically exists only during the non-irrigation season. Since this water is held in the public trust, it is incumbent upon IDFG to assure that any use of this water is primarily intended for the protection and enhancement of fish and wildlife resources in and connected with the Boise River.

Due to significant growth patterns observed in Ada County in recent years, and especially the interest in using Boise River water as a year-round property amenity through upscale housing developments, IDFG has deemed it appropriate to propose a set of criteria and requirements which must be met by developers should use of non-irrigation season flows be proposed or in other instances where developers or homeowners request information on riparian rehabilitation. IDFG will require detailed plans and schematics prior to considering a position on proposed artificial waterways. IDFG will place the responsibility for compliance with criteria on the developer, homeowners association, or individual homeowner. IDFG personnel will not participate in actual rehabilitative work, but will provide technical assistance.

IDFG has observed several problems with existing developments in the Boise area which use diverted Boise River water as a property amenity. The primary problems identified are encroachment within the riparian setback, unnecessary trimming or pruning of established vegetation, and ineffective riparian vegetation plantings. Generally, problems are directly associated with a lack of communication. The intent of this document is to resolve the majority of these problems and foremost to provide the citizens of southwest Idaho educational information on how to improve properties for fish and wildlife.

IDFG has closely coordinated planning with the City of Boise. Individual homeowners, associations, and developers should be aware that establishing standards of this nature in an urban environment is a fairly new science, and therefore, a difficult task. IDFG and the City of Boise have developed these standards, keeping in mind that fish and wildlife should be the primary beneficiaries, since water being run through these developments during the non-irrigation season is held in the public trust for the propagation and perpetuation of fish and wildlife.

The process of planning has specifically been divided into three distinct levels or tiers, based primarily on the size of the waterway involved. This was done based on past experience of fishery management personnel from IDFG. These tiers are described as follows:

Tier 1 Waterway: A waterway where the volume of water transported through the system does not exceed 5 cfs, or width of the channel does not exceed 15 feet, or both (example: interior waters of the River Run Subdivision in southeast Boise).

Tier 2 Waterway: A waterway where the volume of water transported through the system falls between 5 cfs and 150 cfs or width of the channel is greater than 15 feet (example: mainstem of Loggers Creek).

Boise River: The natural channel(s) of the mainstem Boise River.

Tier 1 and Tier 2 waterways will be approached with this document. The Boise River is entirely more complex and will be administered under a separate Boise River System Ordinance. However, the riparian species list provided is also applicable to the mainstem Boise River.

Prior to the development of flowing water channels or ponds, developers can anticipate several problems - these include sedimentation, development of riparian vegetation, rooted aquatic vegetation, and enhancement of channels for fish and wildlife. All of these problems will present a particular challenge to resolve.

The following are issues typically associated with developing artificial waterways and explanations of the negative effect(s) these pose on fish and wildlife. Solutions to remedy these problems are hopefully addressed by providing some guidance through the standards:

Problem 1: Sedimentation will decrease overall productivity of the system for fish and aquatic insects.

Explanation: Sedimentation is generally associated with poor land-use practices which destabilize watersheds. In the case of the Boise River, diversion of high spring flows and construction of low gradient laterals (such as the Loggers Creek system) both led to increases in fine sediment levels. Because low gradient water channels lack sufficient flushing flows to remove accumulated sediments, the problem is cumulative.

Living space and spawning gravels for trout are inundated by accumulations of fine sediments rendering these areas much less suitable for use by these species. Aquatic insect production generally decreases with increases in fine sediment levels. Aquatic insects (such as mayflies and caddisflies) are a primary food source for stream-dwelling trout. Sediment can lead to increases in the production of rooted aquatic vegetation which can "choke off" a low gradient waterway and convert it to a relatively shallow environment with little habitat diversity.

MINIMUM STANDARDS FOR SEDIMENT FOR TIER 1 AND TIER 2 WATERWAYS

There is no simple solution to this critical problem. The long-term goal should be to purge or remove as much sediment from these systems as possible to improve fish and aquatic insect habitats.

In zones or reaches specifically designated for trout spawning, some maintenance work will be needed to eliminate significant accumulations of fine sediment in spawning-size gravels (0.75 to 3.0 inches). This can reasonably be accomplished by physically manipulating gravels, or by use of a suction-type dredge. The former is the simplest and most economical method, but its applicability is probably limited to spawning zones. This can be done with pitchforks or durable metal rakes in small areas or a small backhoe in larger systems. In larger zones where a variety of habitats are affected, a suction dredge might be considered an appropriate tool. Dredges are both costly to purchase and operate and their utility might be limited by access problems or disposal of sediment. Maintenance should be done at least every two years, or more, depending on sediment input.

In working on a channel recovery from sediment overload, developers or other responsible parties can work to simultaneously: (1) arrest the source(s); (2) develop sediment traps in-stream, in side channels, or in alcoves and/or off-channel sites; and (3) change the structure of the better habitat reaches so that sand-sized (0.62 mm to 2.0 mm) and smaller substrate particles will be passed through the reaches and the thalweg will be deepened. These ideas should generally be considered and planned for prior to constructing amenity waterways, because there can be no doubt that fine sediment will cause problems.

Problem 2: A lack of a well-developed riparian vegetation zone along waterways destabilizes the system and makes it significantly less valuable for fish and wildlife.

Explanation: Riparian vegetation is the life-blood of flowing water systems. Well developed riparian vegetation complexes lend to the formation of undercut streambanks and other vital in-stream habitat features for fish. This vegetation also provides food and shelter for wildlife as well as nesting areas for waterfowl and other birds. Canopy cover moderates water temperature through shading. Vegetation provides a haven for insects which are important food items for fish and wildlife. Riparian buffer zones act as a protective barrier which can absorb overland sediment and nutrient inputs that could be detrimental to a river, stream, or pond. The lack of or removal of riparian vegetation indirectly results in fewer and, in some instances, a complete absence of fish and wildlife species.

MINIMUM STANDARDS FOR VEGETATION FOR TIER 1 WATERWAYS

Concerning proposed projects, the developer will be held responsible for the initial planting of riparian vegetation. Following establishment of a homeowners association, if appropriate, the association will assume the responsibility of enforcing standards. Other individuals or parties interested in riparian rehabilitation can follow the recommendations of this document:

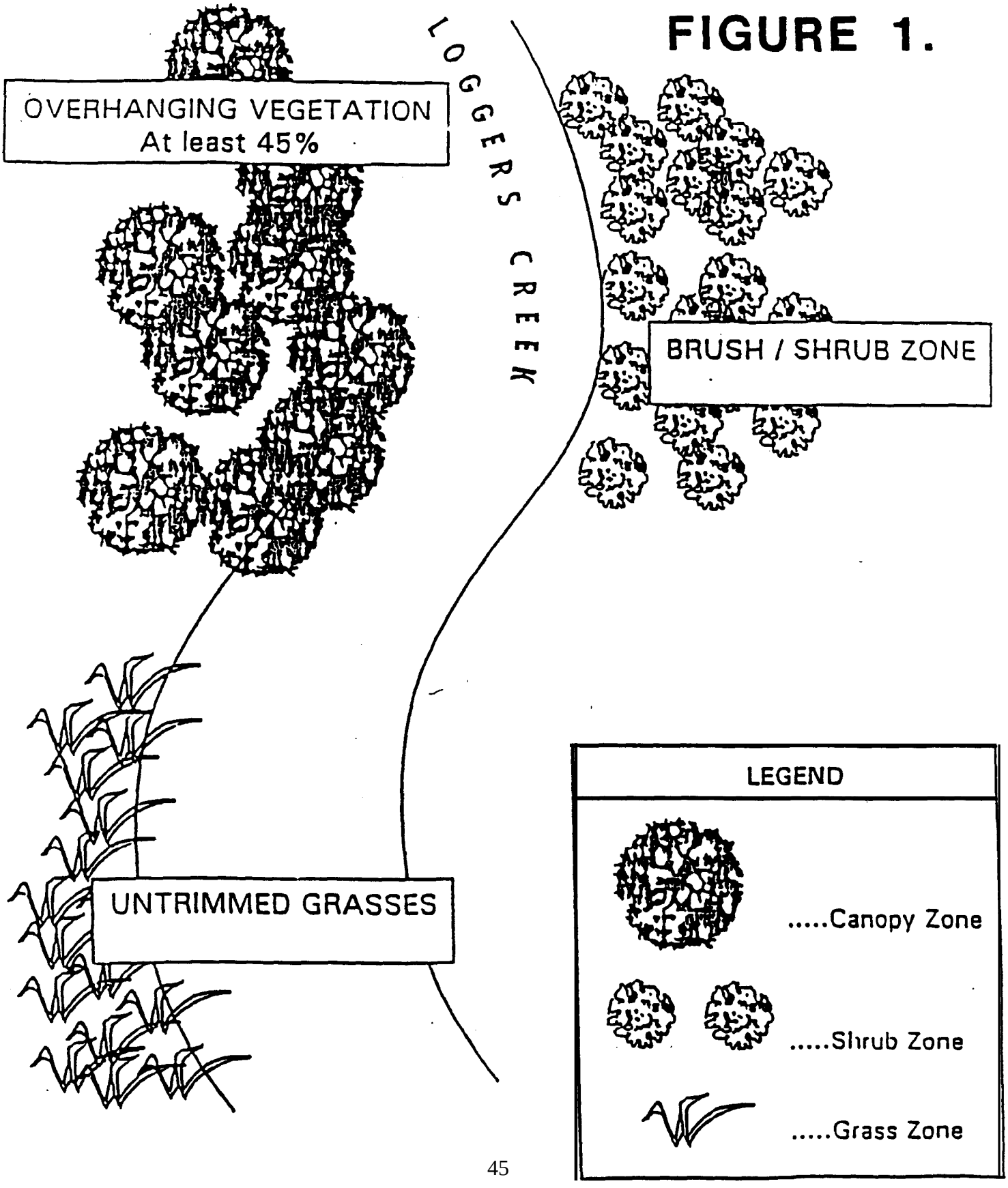
A. To develop or enhance riparian vegetation along waterways, deciduous trees and shrubs (brush) should be planted so that eventually at least 45 percent of the stream channel adjacent to any lot will be covered by overhanging vegetation (Figure 1). This vegetation should remain untrimmed on the stream-facing side. Grasses or other vegetation intermixed within this component should remain untrimmed in at least a four-foot wide or greater strip. This standard (A) is the key criteria IDFG would like established.

   Following the planning for or establishment of standard A, the responsible party can either plant the remaining area in low brush or grasses using the following standards:

B. Shrubs can be planted in At least a four-foot wide strip from the stream bank. Again, all shrubs or grasses within this strip should remain untrimmed to increase suitability for fish and wildlife.

C. Grasses alone can be planted in at least a two-foot wide or greater strip. Grasses can be trimmed down to no more than 12 inches only in designated view corridors. View corridors are discussed later in this document.

Appendix 1. Continued.



Appendix 1. Continued.

MINIMUM STANDARDS FOR VEGETATION FOR TIER 2 WATERWAYS

A minimum 25-foot wide zone of suitable riparian vegetation (grasses, shrubs, and trees) should be maintained where already in existence, or planted where none exists. The purpose of such a buffer zone is for wildlife habitat, stabilization of stream banks, and water quality. The latter two would benefit fish. The riparian area shall cover at least 25 feet from the Boise River "Line of Regulation" (6,500 cfs line) and 25 feet from the banks of side channels, such as Loggers Creek. No clear-cutting of natural vegetation, including understory or mowed lawns, shall be allowed. Native species of vegetation are being recommended for the most part, since they are indigenous to the area and would perform best. Native plants also do not usually require permanent irrigation. Please refer to the riparian vegetation species list for recommended grasses, shrubs, and trees (Attachment 1). Please take extra precaution to protect valuable species, such as black cottonwood and species of willow, with chicken wire or chain-link fencing to make them less palatable to beaver. Fencing should be at least 4 feet tall. All plant species not specifically listed (example: ornamentals) should be planted outside of the established riparian zone.

Again, deciduous trees and shrubs shall be planted so that eventually at least 45 percent of the stream channel adjacent to any lot shall be covered by overhanging vegetation. Deciduous trees and shrubs should be particularly concentrated within the initial 15 feet of the stream bank and along property boundaries (Figures 2 and 3). Grasses or other recommended plants should be intermingled within this zone of trees and shrubs to provide additional ground cover. Shrubs and grasses could comprise the remaining area, keeping in mind that no mowing or trimming is allowed. except in designated view corridors.

MINIMUM STANDARDS FOR VEGETATION FOR TIER 3 WATERWAYS

The riparian species list is applicable to the mainstem Boise River. Other issues regarding the Boise River are addressed in the Boise River System Ordinance developed by the City of Boise.

Problem 3: The lack of vegetation along amenity ponds diminishes the quality of the area for waterfowl, wildlife, and fish and can lead to decreased water quality.

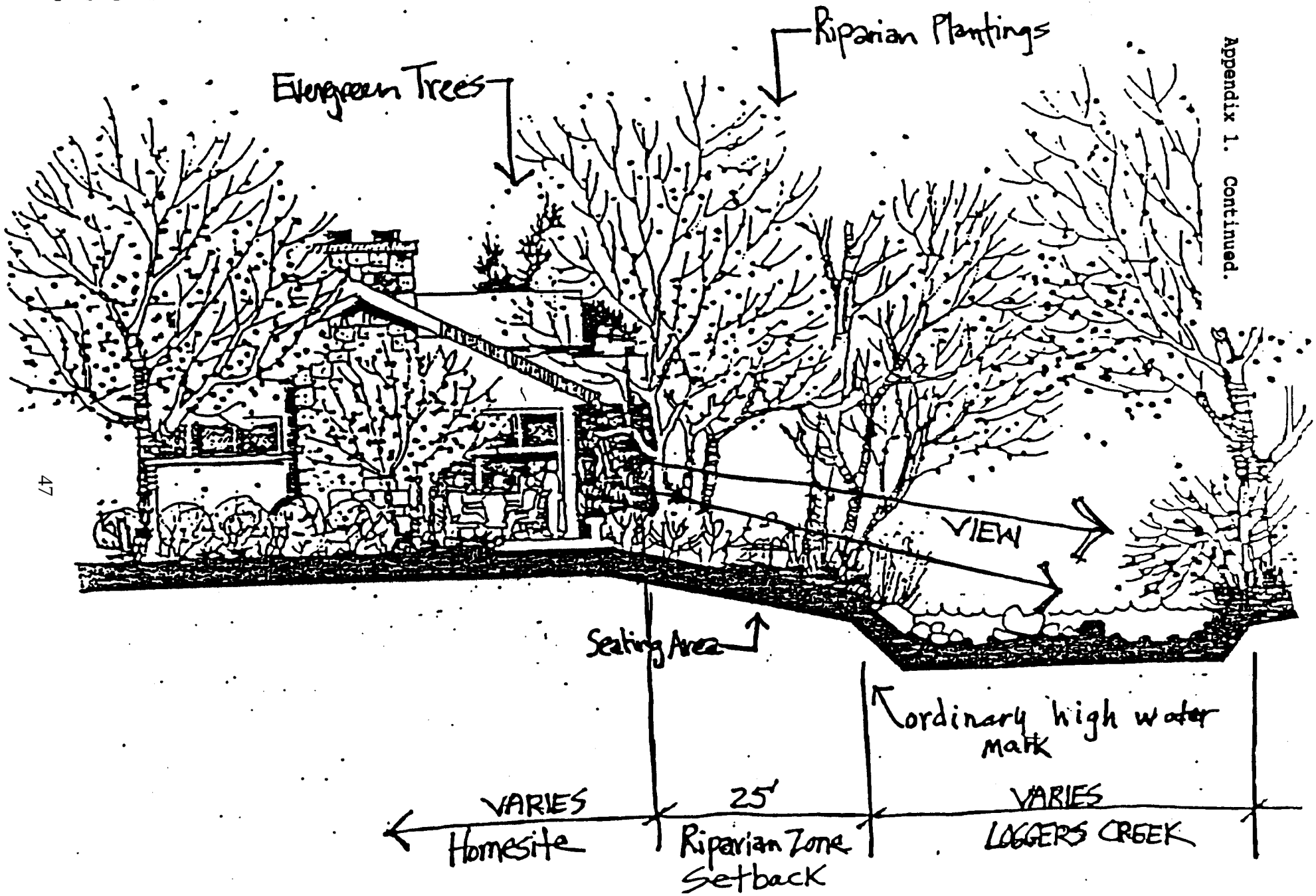
Explanation: As previously discussed, the lack of riparian vegetation along waterways renders the area less suitable for fish and wildlife. This can also apply in lentic (non-flowing) waters. Additionally, problems arise with water quality when fertilizers are applied to adjacent lawns and/or common areas and then sprinkler-irrigated, which washes nutrients directly into streams or ponds. Aquatic plant growth (primarily algae) is quickly accelerated or enhanced by the addition of nitrogen and phosphorus.

MINIMUM VEGETATION STANDARDS FOR URBAN PONDS

It is recommended that nq less than a four-foot wide buffer strip of untrimmed riparian vegetation be maintained around the periphery of ponds. At least 30 percent of the buffer zone should be comprised of deciduous trees/shrubs; the remaining area could be grasses or sedges. Please refer to Figure 4 for an example.

Should the desire exist to develop waterfowl nesting platforms, please consult with IDFG.

FIGURE 2.


Riparian Plantings
Evergreen Trees
VIEW
Seating Area
ordinary high water mark
VARIES
Homesite
25'
Riparian Zone Setback
VARIES
LOGGERS CREEK

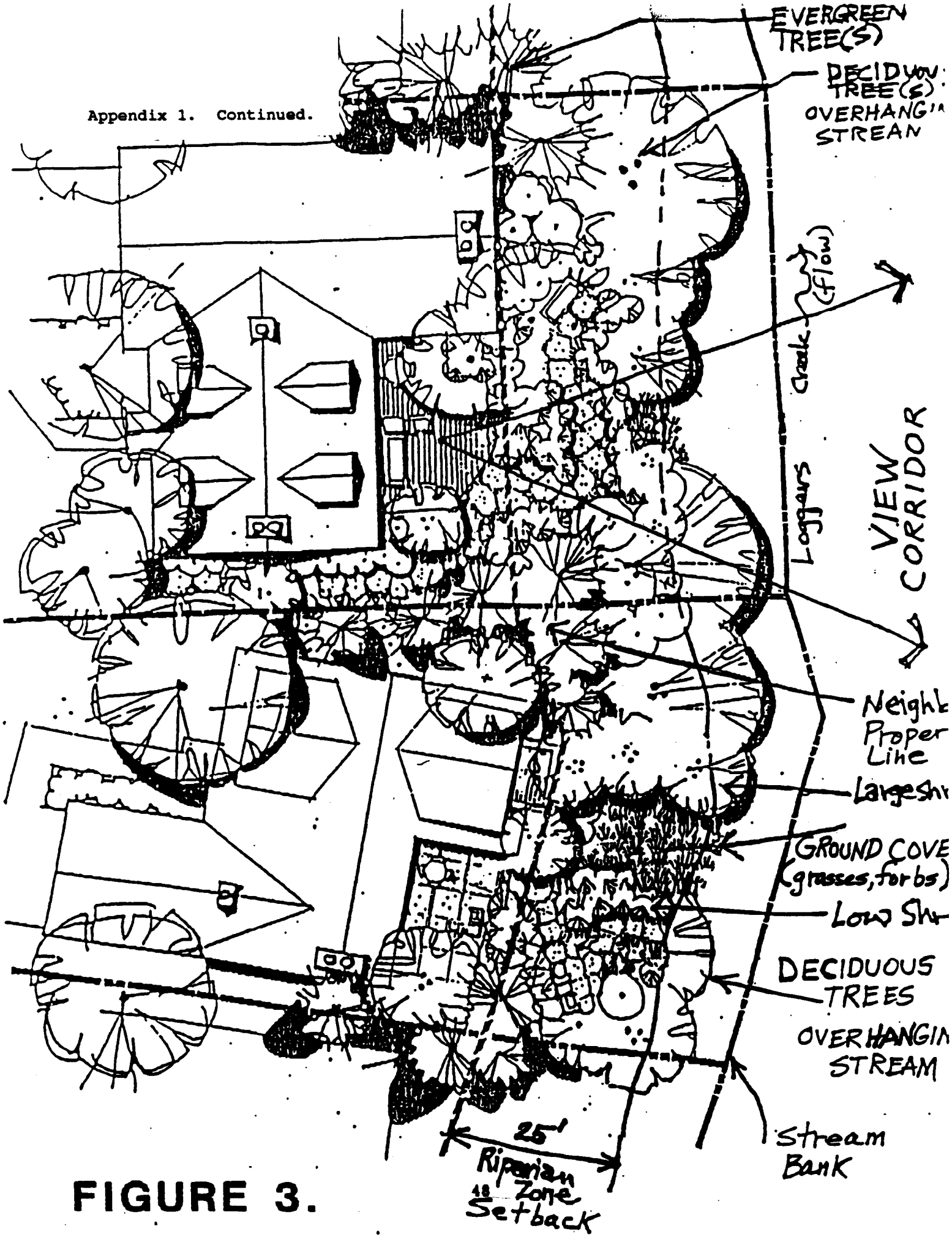

EVERGREEN TREE(S)
DECIDUOUS TREE(S) OVERHANGING STREAM
Creek (Flow)
Loggers
VIEW CORRIDOR
Neighb Proper Line
Large Shr
GROUND COVE (grasses, forbs)
Low Shr
DECIDUOUS TREES
OVERHANGIN STREAM
Stream Bank
25' Riparian Zone Setback

FIGURE 3.

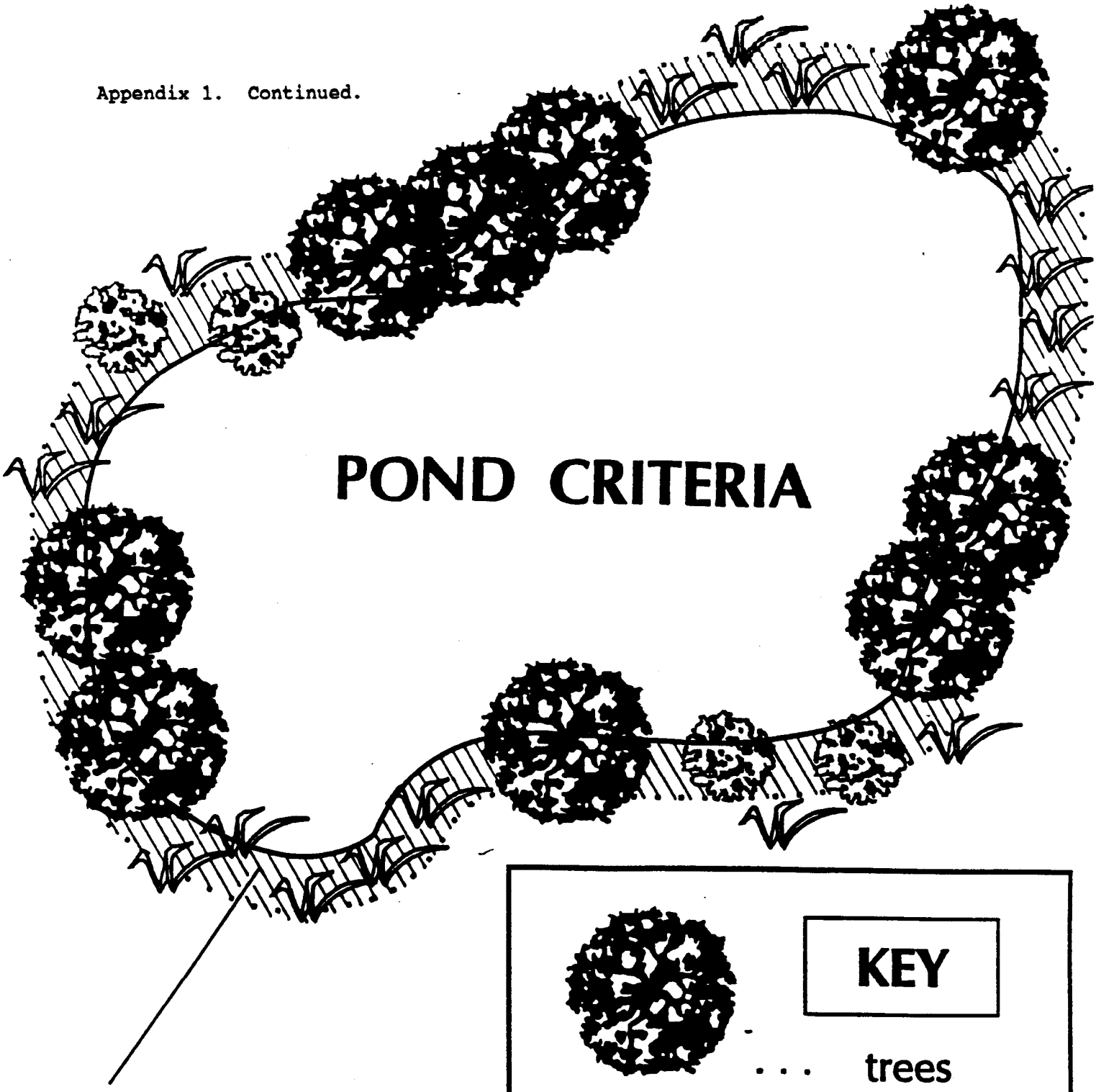

POND CRITERIA
4 foot wide riparian buffer strip
KEY
. . . trees
. . . shrubs
. . . grasses

FIGURE 4.

Appendix 1. Continued.

Problem 4: The direct application of herbicides and algicides to waterways for the control of problem aquatic vegetation can cause fish and aquatic insect kills.

Explanation: Chemical applications pose a serious threat to the development of fish populations and the quality of the aquatic environment. Copper sulfate is the most commonly used algicide and, when not applied correctly, will kill fish and aquatic insects. Aquatic vegetation is a normal component of waterways, particularly ponds. It provides cover for fish and a substrate for aquatic insects. Aquatic vegetation also releases oxygen into the aquatic environment. Accumulations of fine sediment can accelerate the spread of rooted aquatic plants such as pond weeds, which at times can become a nuisance. The buildup of rooted aquatic plants in flowing waters also slows down the flow of water, which causes ideal conditions for the proliferation of more aquatic plants.

Another less obvious cause of the increased growth patterns or spread of aquatic plants is possibly due to frequent fertilization of adjacent lawns and common areas. Plant growth is obviously accelerated by nitrogen and phosphorus inputs. This pattern could be significantly slowed by a well-developed riparian buffer zone adjacent to waterways, which could filter out much of the nutrient input. Fertilizers should be applied judiciously near water.

MINIMUM STANDARDS FOR CHEMICALS FOR TIER 1 AND TIER 2 WATERWAYS

Chemicals pose a threat to the continued development of fisheries as well as degrading the quality of the aquatic environment. IDFG stronaly recommends against the use of herbicides/algicides in waterways where trout are present since the likelihood of a fish kill is high. Chemicals are not always applied correctly or responsibly and fish kills have occurred as a consequence in the Boise area. Mechanical treatment and/or direct removal of rooted aquatic plants is feasible using aquatic weed cutters and rakes, which are available through catalog stores such as Cabella's in Sydney, Nebraska.

Should chemical treatment of aquatic plants be desired, applicants should contact experts from the Idaho Department of Health and Welfare, Division of Environmental Quality. Applicants should be forewarned that citations will be issued to the responsible applicant for fish kills caused by destructive substances under Title 36-902(a) of the Idaho Code, which states that it is unlawful to deposit, throw, place, allow, or cause to pass into any of the waters of this state any deleterious drugs, toxicants, chemicals, poisonous substances, explosives, electrical currents, or other material which may tend to destroy, kill, disable, or drive away fish.

Some insecticides commonly used on lawns or common areas are highly toxic to fish and other aquatic life. Please use extreme caution prior to and during application. Leave an adequate buffer zone adjacent to surface waters (5 to 10 feet).

Problem 5: Dewatering of stream channels will kill or displace trout populations, directly affect other aquatic biota, and displace waterfowl and other wildlife.

Explanation: Dewatering of stream channels has occurred in other amenity water systems in the Boise area for aquatic vegetation control, to alleviate ice jams, and for unidentified reasons. The lack of continuous flows is destructive to aquatic environments, especially to fish and aquatic insects.

Appendix 1. Continued.

MINIMUM STANDARDS FOR STREAM FLOWS FOR TIER 1 AND TIER 2 WATERWAYS

IDFG expects continuous (year-round) flows in all artificial waterways containing salmonids where the development uses maintenance flow water from the Boise River during the non-irrigation season. When IDFG allows diversion of this maintenance flow into amenity waterways, the purpose is to enhance fish and wildlife values. Therefore, continuous flows will be maintained, barring emergency circumstances such as extreme ice buildup or unexpected floodwater.

Any party deliberately altering the flow of water in an artificial waterway which results in a fish kill will be cited under Title 42-3803(a) of the Idaho Code.

Problem 6: Fish migration barriers preclude the upstream movement of trout.

Explanation: The obstruction of fish movement within a system can seriously affect spawning migrations and daily and/or other seasonal movements, which prevents intermixing within populations and results in underseeding of available habitat.

MINIMUM STANDARDS FOR FISH PASSAGE FOR ALL WATERWAYS

All potential fish barriers must provide IDFG-approved fish passage facilities. Detailed plans should be provided to the regional office for approval by the staff and Engineering Bureau.

Problem 7: View corridors and other amenities near waterways can sometimes diminish the suitability of an area for fish and wildlife.

Explanation: Homeowners generally want a largely unobstructed view of flowing waterways to watch wildlife and for simply aesthetic reasons. The problem arises when the view corridor area encompasses a significant portion (>50 percent) of the individual lot or collective lots. Wildlife species, as well as most waterfowl, do best and frequent areas with security cover where they seek protection from potential predators. Fish species need overhead cover (vegetation or debris) for security. As previously mentioned, a sparsity of riparian vegetation along flowing waterways renders the system much less suitable for fish and wildlife. Homeowners will decrease their ability to view wildlife in semi-natural environments by creating a primarily artificial situation, such as a largely open view corridor.

MINIMUM STANDARDS FOR VIEW CORRIDORS FOR TIER 1 AND TIER 2 WATERWAYS

IDFG recommends that no more than 20 to 40 percent of a lot or reach by ownership should be incorporated into a distinctive view corridor. As an example, if the linear distance of a lot is 200 feet, then a view corridor could be from 40 to 80 feet wide. It does not have to be contiguous. Remember that grasses should not be trimmed to less than 12 inches in view corridors.

Walking paths and seating areas should be incorporated within established view corridors. Walking paths constructed adjacent to the waterway along a lot encompass too much of the potential riparian zone and take away from its effectiveness. Therefore, walking paths should not be developed parallel to flowing waterways along the length of entire lots. Paths should be no wider than 3 feet. The path should be constructed of noncontinuous or porous surface material to prevent surface runoff and soil erosion.

Small seating areas are acceptable and should not exceed 40 square feet in size. They should be developed in view corridors.

Problem 8: Rocks placed along stream banks without regard to fish habitat can essentially armor banks, rendering them unavailable for use by trout.

Explanation: Large rocks have been used regularly in river and stream rehabilitation and landscaping for many years, primarily along stream banks which are erosive in nature. Stream bank cover is an extremely critical component of the overall trout stream environment. Loss of stream bank cover has been documented to cause declines in the number of trout present. When stream banks are rip-rapped with large rock, oftentimes the undercut associated with bank cover is eliminated. Please refer to Figure 5 for an example of natural and degraded bank cover. If this practice becomes widespread along river banks, bank cover is appreciably reduced and a corresponding decline in trout numbers may be observed.

MINIMUM STANDARDS FOR RIP-RAPPING AND ROCK PLACEMENT FOR TIER 1 AND TIER 2 WATERWAYS

Rip-rapping of stream banks should be done judiciously. It is not particularly needed in most low gradient waterways where erosion is not generally a problem. Revegetating stream banks is the method preferred by IDFG.

IDFG understands the desire of homeowners and professional landscapers to use large rocks (boulder size) in riparian development planning. The rock can be aesthetically pleasing. However, if rock placement is done without some planning for the needs of trout, critical bank cover will be lost. Therefore, IDFG recommends that rock placement along banks be limited to no more than 10 percent by ownership of individual lots. As an example, if a lot is 150 feet long, large rock placement should not exceed 15 feet in total linear distance along streamside areas.

Additionally, IDFG would like rock placement to be done to artificially simulate undercut stream banks. This can be done by keying large or medium size flat rocks into banks or by cantilevering rocks along the bank (Figures 6 and 7). This should offset any permanent loss of bank cover for trout.

One key point should be made at this time - should the interested party decide to use rock placement for landscaping or other reasons along stream banks, and rock is to be placed below the mean high water mark (which it generally is), then a stream channel alteration permit must be obtained from the Idaho Department of Water Resources (IDWR), Western Region, 2735 Airport Way, Boise, Idaho 83705; the telephone number is (208) 334-2190. These applications for permits are reviewed jointly by IDWR and the U.S. Army Corps of Engineers. These agencies solicit comments from resource agencies such as IDFG, so the application will be closely scrutinized pertaining to fish and wildlife habitats.

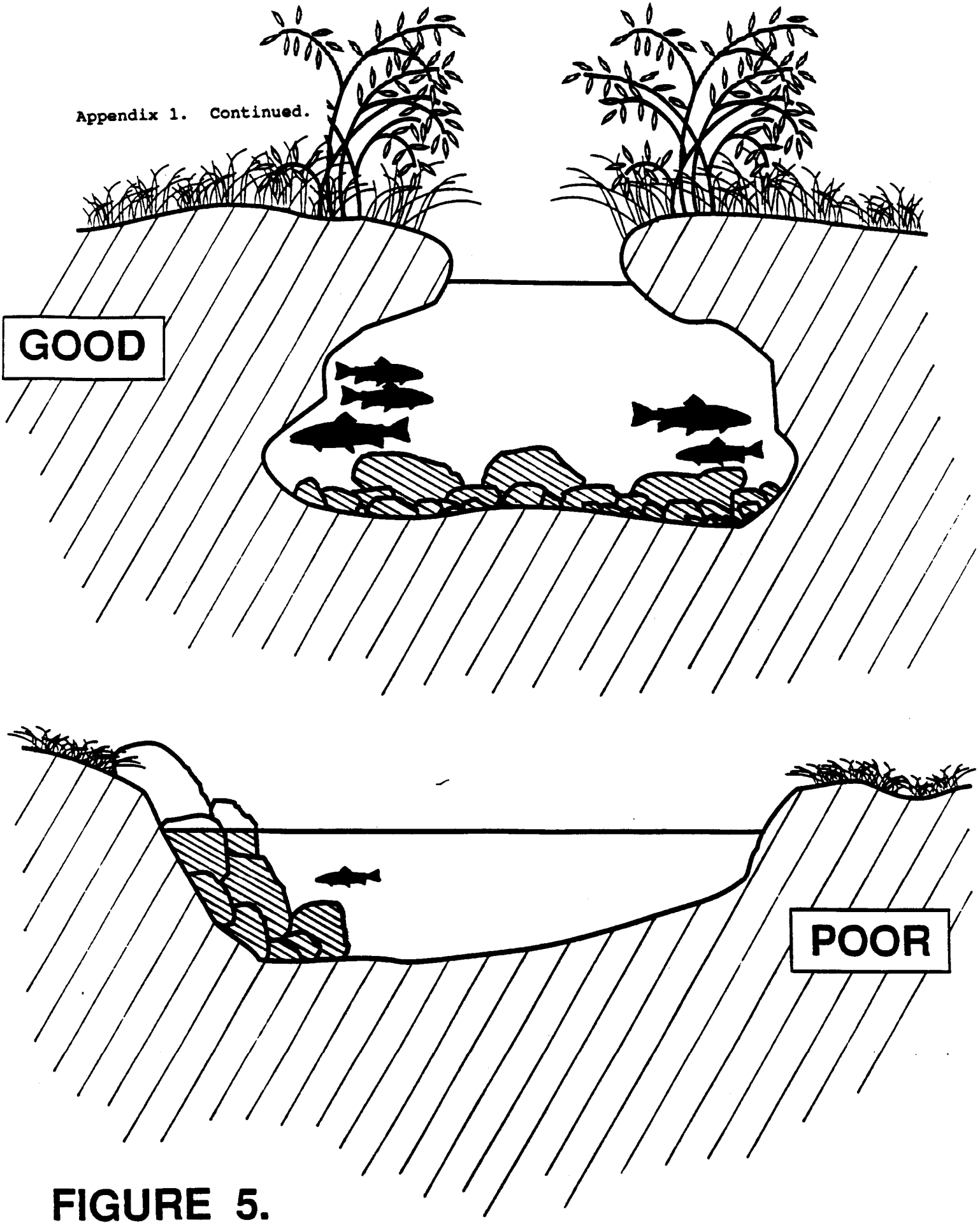


FIGURE 5.

FIGURE 6.

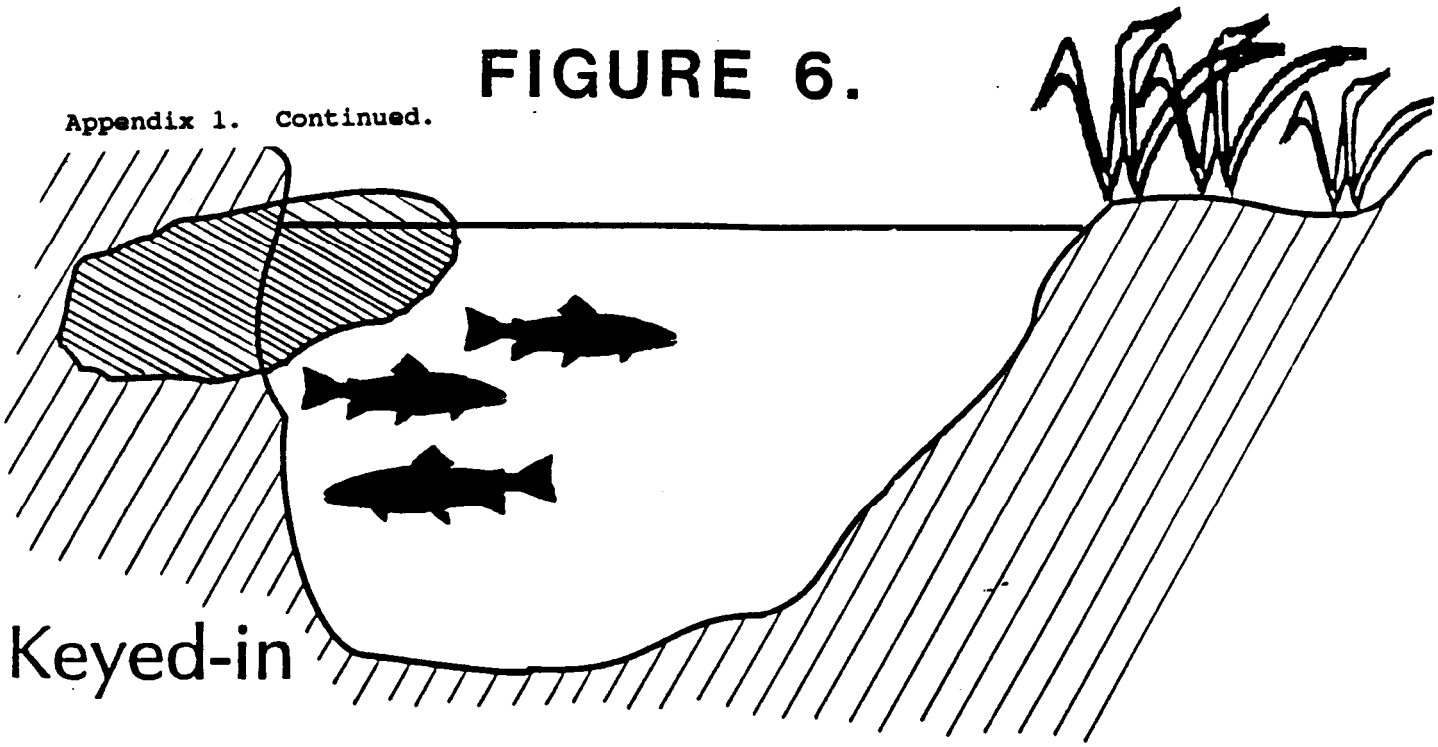
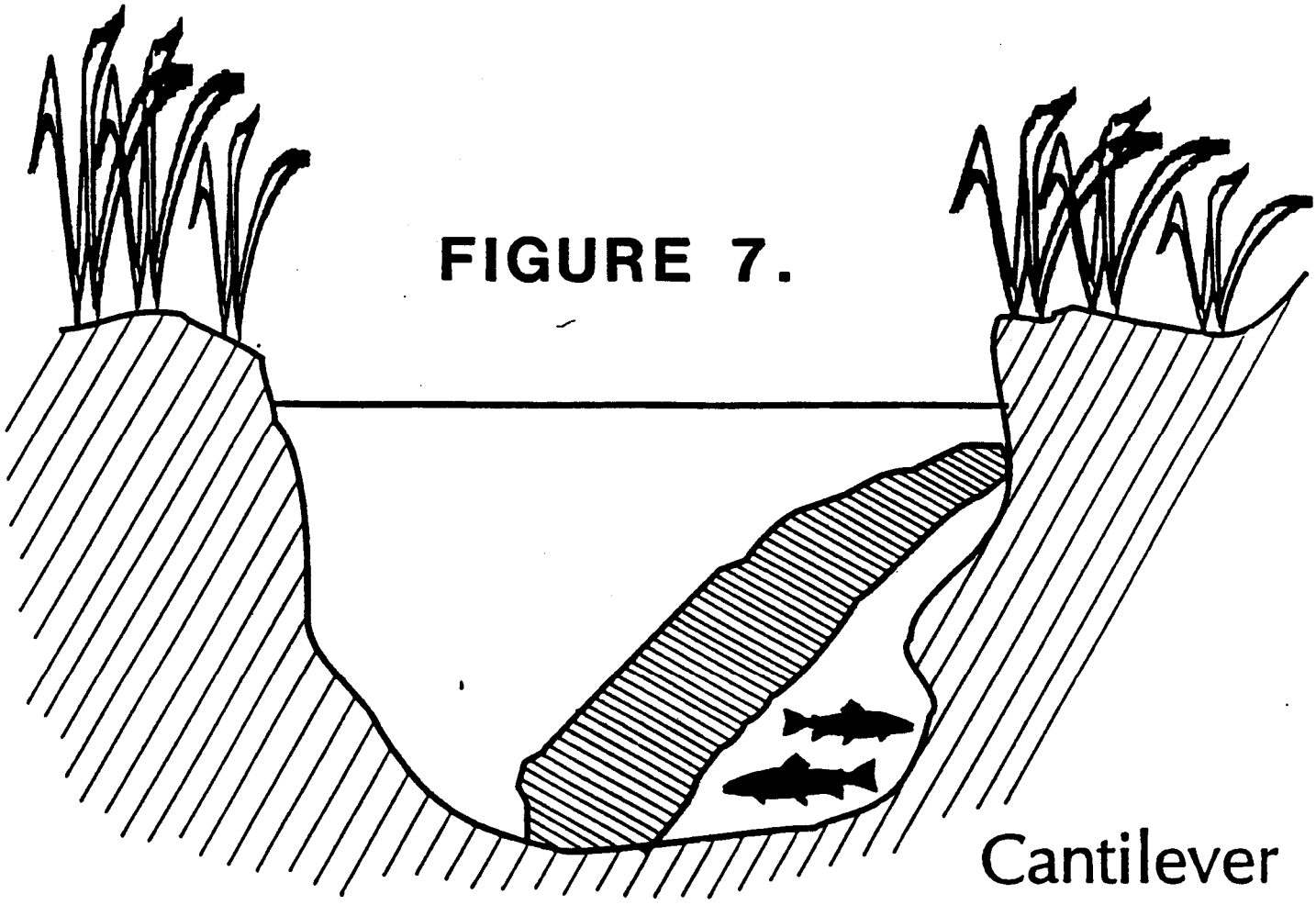


FIGURE 7.



Problem 9: A lack of woody debris present within a flowing waterway can limit trout numbers.

Explanation: Woody debris typically is naturally added to stream channels through the death of riparian vegetation or by root systems. These natural aggregations of woody debris are critical cover components for all sizes of trout in flowing water systems, and should not be removed. Woody debris can accumulate fine and coarse sediments and form distinct microenvironments such as backwaters, eddies, or pocketwaters, which are particularly important for fish in higher gradient reaches. Stream channels which lack habitat diversity can be greatly enhanced by the addition of woody materials.

MINIMUM STANDARDS FOR IN-STREAM SHELTER AND COVER FOR TIER 1 AND TIER 2 WATERWAYS

The accumulation of woody debris through natural processes is encouraged. Do not automatically remove tree limbs or branches and/or entire trees from waterways when they fall into the water. Should the woody debris cause problems with diversion of water, consider removing it and placing it somewhere more stable. Should natural additions of woody debris be allowed to occur, artificial supplementation would be kept to a minimum.

Should supplementation be necessary, IDFG recommends the development of one unit of woody debris per 100 square meters (1,076 square feet) of water surface area. A unit, is defined as an aggregation of woody material which provides a minimum of two square meters (22 square feet) of habitat that contains overhead cover and reduced water velocity. For example, if a stream section of concern is 50 meters (164 feet) long and averages 5 meters (16.4 feet) in width, the stream section has a water surface area of 250 square meters (2,690 square feet). This section would require two and one-half units of woody debris to address the standard. Woody debris could consist of logs, tree stumps, or branches, preferably in sizable aggregations to be valuable as cover for trout. Artificial units might need to be keyed in or anchored into banks or the substrate to provide stability. Please approach IDFG for technical assistance.

Problem 10: The lack of formal maintenance plans for new developments with water amenity channels or ponds could lead to a non-coordinated effort to enhance conditions for fish and wildlife.

Explanation: Without a formal maintenance plan for riparian habitats along water amenities, the burden of enhancing these areas for fish and wildlife lies with no one. Thus, the condition of the riparian zone will deteriorate through time and consequently so will the necessary environs for fish and wildlife. There must be a system in place to make individual homeowners or associations responsible for maintaining or enhancing, if necessary, all amenity water systems, particularly the condition of riparian zones.

Appendix 1. Continued.

MINIMUM STANDARDS FOR MAINTENANCE PLANS AND AGREEMENTS FOR TIER 1 AND TIER 2 WATERWAYS

IDFG requests a maintenance plan for all proposed developments which use water diverted from the Boise River during the non-irrigation season. The maintenance plan will identify the party(ies) responsible for enforcing the requirements of the plan. Generally, this would be a homeowners association which is also responsible for enforcing the covenants, conditions, and restrictions of subdivisions. The maintenance plan should be considered for inclusion in the covenants, conditions, and restrictions. The following items should be in the maintenance plan:

1. Monitoring the progress of riparian vegetation.

2. Fine sediments accumulating on the substrate need to be assessed. The plan should address remedial action(s) for removal or dispersal of sediments.

3. Fertilizers applied to grounds adjacent to surface waters need to be applied responsibly. Organic enrichment of surface waters promotes the growth of aquatic vegetation. How will this potential problem be avoided?

4. Trimming or mowing of riparian vegetation needs to be closely regulated. How will problems be addressed?

1. Contractors need to be educated about riparian values and functions prior to any construction taking place. A program should be established for all developments.

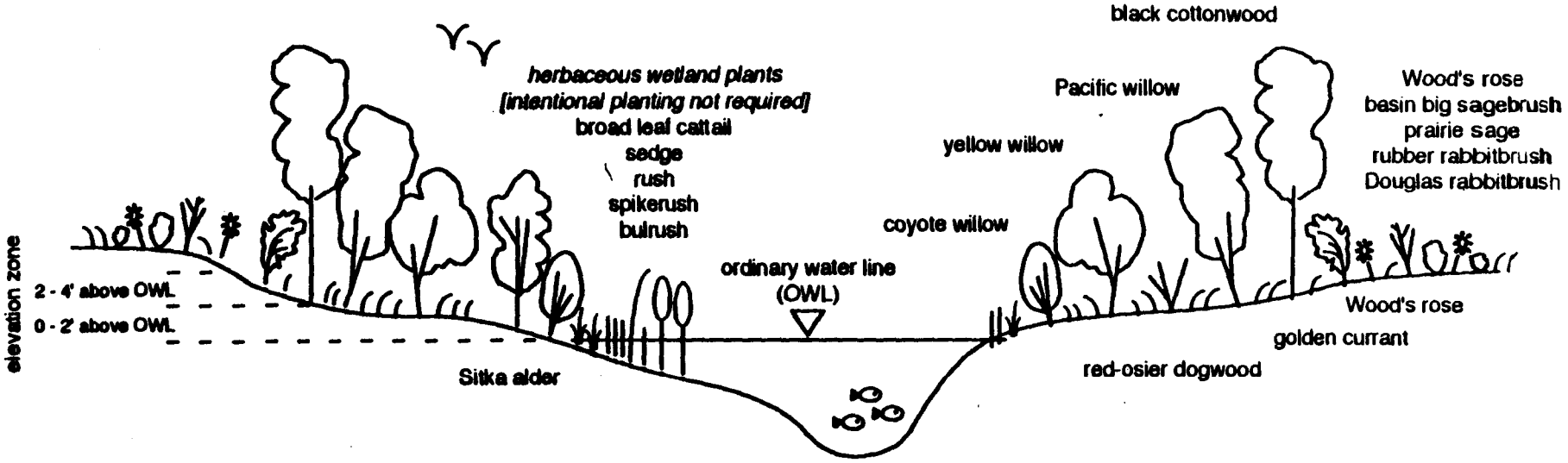
Idaho Department of Fish and Game - Region 3 Prescription for Revegetation of Wetlands, Riparian Areas, and Uplands Within a Typical Southwest Idaho Stream Corridor

Attachment 1.

Designed by: Ecological Design, Inc.
Rob Tiedemann, CFS, CWB
January 1992

Typical Section of a Revegetated Stream Corridor

Principal tree and shrub species are drawn and labeled on this typical section. Principal and occasional tree and shrub species are listed in the plant species list on page 2 of this document.



Note: Not to Scale

The typical section, plant species list, planting rates, and planting methods prescribed by this document are the Idaho Department of Fish and Game - Region 3 minimum standard for revegetation of stream corridors in southwest Idaho. Compliance with this standard will satisfy the requirements of Idaho Department of Fish and Game - Region 3, but not necessarily those of other resource and regulatory agencies. The standard is generally applicable to most situations, however restoration and replication of some stream corridors may require analysis of the site and development of a site specific plan by professionals.

Most plant species prescribed by this standard are native to southwest Idaho. They are best adapted to the environment, provide habitat for both game and nongame fish and wildlife, and complement adjacent naturally occurring landscapes. All species are commercially available from regional vendors. A partial list of regional vendors is provided. A complete, current list is available from the publication *Hortus Northwest - A Pacific Northwest Native Plant Directory and Journal*, PO Box 955, Canby OR 97013, 503 260-7968.

The minimum standard requires planting within the stream corridor all tree and shrub species identified as principal species in the plant species list on page 2 of this document. They are also drawn and labeled on the typical section. All other listed tree and shrub species are occasional species. Athough not required, they may be planted to further enhance fish and wildlife habitat, and provide a greater diversity of visually attractive plants. Occasional species may also be selected for their suitability to mountain, high desert, or valley floor environments. Professionals can provide further guidance.

The minimum standard also requires planting within the stream corridor 3 grass species and 2 wildflower species identified in the plant species list on page 2 of this document. The list includes grasses well adapted to alkali and sandy soils.

The minimum standard does not require intentional planting of herbaceous wetland plants. However, desirable species which naturally colonize a site should be retained and protected.

Idaho Department of Fish and Game - Region 3 Prescription for Revegetation of Wetlands, Riparian Areas, and Uplands Within a Typical Southwest Idaho Stream Corridor

Attachment 1. Continued.

Designed by: Ecological Design, Inc.
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January, 1992

Plant Species List and Planting Rates

Riparian Trees (planted OWL to 2' above OWL)
•Pacific willow (aka whiplash willow) - Salix lasiandra var. caudata
water birch - Betula occidentalis

Riparian Trees (planted 2' - 4' above OWL)
•black cottonwood - Populus trichocarpa
quaking aspen - Populus tremuloides

Riparian Shrubs (planted OWL to 2' above OWL)
•coyote willow (aka sandbar willow) - Salix exigua var. exigua
•yellow willow - Salix lutea
•red-osier dogwood - Cornus stolonifera (aka Cornus sericia)
•Sitka alder (aka mountain alder) - Alnus sinuata
geyer willow - Salix geyeriana

Riparian Shrubs (planted 2' - 4' above OWL)
•golden currant - Ribes aureum
shrubby cinquefoil - Potentilla fruticosa
Rocky Mountain maple - Acer glabrum
syringa - Philadelphus lewisii
common snowberry - Symphoricarpos albus
saskatoon serviceberry - Amelanchier alnifolia
netleaf hackberry - Celtis reticulata
chokecherry - Prunus virginiana
Douglas hawthorne - Crataegus douglasii
blue elderberry - Sambucus cerulea

Upland Trees (planted > 4' above OWL)
ponderosa pine - Pinus ponderosa
Rocky Mountain juniper - Juniperus scopulorus

Upland Shrubs (planted > 4' above OWL)
-Wood's rose - Rosa woodsii
•basin big sagebrush - Artemesia tridentata ssp. tridentata
•prairie sage - Artemesia ludoviciana (Planting rate: 2 pounds pure live seed / acre)
•rubber rabbitbrush - Chrysothamnus nauseosus
•Douglas rabbitbrush - Chrysothamnus viscidiflorus
oakbrush sumac - Rhus trilobata
mountain lover - Pachistima myrsinites
kinnikinnick - Arctostaphylos uva-ursi
redstem ceanothus - Ceanothus sanguineus
creeping Oregon grape - Mahonia repens (aka Berberis repens)

	Planting rate (pounds pure live seed / acre)
Grasses (planted above OWL) - select 3 species.	
western wheatgrass - Agropyron smithii	5
"Whitmar" bluebunch wheatgrass - Agropyron spicatum	5
"Magnar" basin wildrye - Elymus cinereus	5
"Covar" sheep fescue - Festuca ovina	3
needle and thread - Stipa comata	2
"Canbar" Canby bluegrass - Poa canbi	2
"Garrison" creeping foxtail - Alopecurus arundinaceus	5
Species adapted to sandy soils:	
sand dropseed - Sporobolus cryptandrus	1/2
"Nezpar" Indian ricegrass - Oryzopsis hymenoides	3
Species adapted to alkali soils:	
"Alkar " tall wheatgrass - Agropyron elongatum	5
alkali sacaton - Sporobolus airoides	1/2
Wildflowers (planted > 2' above OWL) - select 2 species.	
"Appar" Lewis flax - Linum lewisii	4
common yarrow - Achillea millefolium	1/2
arrowleaf balsamroot -Balsamorhiza sagittata	1 1/2
goldenrod - Solidago occidentalis	1
Rocky Mountain penstemon - Penstemon strictus	1
Hooker's evening primrose - Oenothera hookeri	2
Indian paintbrush - Castilleja spp.	-
lupine - Lupinus spp.	-
columbine - Aquilegia spp.	-
camas - Camassia spp.	-

Herbaceous Wetland Plants (below OWL)
The following herbaceous wetland plant species will often naturally colonize a disturbed site. Intentional planting is not required by the Idaho Department of Fish and Game - Region 3 minimum standard, but may be accomplished by planting bare root plants, runners, stolons, tubers and seed. Some are commercially available.

broad leaf cattail - Typha latifolia
sedge - Carex spp.
rush - Juncus spp.
spikerush - Eleocharis spp.
bulrush - Scirpus spp.
iris - Iris spp.

Note: All plants shall be true to genus and species. Substitutions are not acceptable. Common names may differ between vendors and may not be the plants in this list.

• Indicates principal tree and shrub species. They *must* be planted. All other listed tree and shrub species are occasional species and *may* be planted.

Idaho Department of Fish and Game - Region 3 Prescription for Revegetation of Wetlands, Riparian Areas, and Uplands Within a Typical Southwest Idaho Stream Corridor

Attachment 1. Continued.

Designed by: Ecological Design, Inc.
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January 1992

Planting Rates (continued) and Methods

Tree and shrub species are planted at the elevations above the ordinary water line (OWL) shown by the typical section. Principal species are planted at a maximum distance of 5' on-center, occasional species are planted at a density determined by the project proponent and professionals. Principal and occasional species are planted either in a random pattern, with individuals of each species distributed throughout the elevation zone, or in single species blocks distributed throughout the elevation zone.

All trees and shrubs are planted as tubelings or other rooted stock, except prarie sage (*Artemesia ludoviciana*) which is presently available only as seed. Tubelings and other rooted stock are planted between May 1 and June 15, seed is planted between October 1 and November 15.

Tubelings and other rooted stock are planted by pushing a hole in the soil using a dibble or other device. The hole is at least equal in depth and diameter to the below ground portion of the plant. A slow release fertilizer tablet is placed at the bottom of each hole before planting. The tubeling or rooted stock is carefully positioned in the hole without bending the roots and the surrounding soil firmly compacted by hand around each plant.

Grass and wildflower species are planted at the elevations above the OWL shown by the typical section. All grasses and wildflowers are planted as seed, between October 1 and November 15. Seed is drilled at the indicated rate, or broadcast and mechanically raked to insure good contact with the soil. Grass seed is planted at a depth of 1/4" in clayey soils, 1/2" in loamy soils, and 3/4" in sandy soils. Wildflower seed is planted no deeper than 1/4". Wildflowers should be planted separately from grasses to avoid competition. Drilled wildflower and grass seed should be planted in separate rows. Broadcast wildflower and grass seed should be planted in separate blocks.

Topsoil may be placed on the planting bed, but is not normally required. Topsoil may encourage the growth of weedy plant species. Weeds should be physically pulled and removed, rather than treated with herbicides, to best protect fish and desirable plant species. Temporary irrigation water may be required during the period of plant establishment. Permanent irrigation water is required to grow riparian plant species greater than 4' above the OWL. Treatment of the soil surface with fertilizer may encourage the growth of weedy plant species, both on the ground and in the water. It should be avoided.

Partial List of Regional Plant Vendors

Balance Restoration Nursery
PO Box 587
Scottsburg, OR 97473
503 587-4261

Bitterroot Native Growers, Inc.
445 Quast Lane
Corvallis, MT 59828
406 961-4991

Clifty View Nursery
Route 1
Box 509
Bonners Ferry, ID 83805
208 267-7129

Granite Seed
1697 West 2100 North
Lehi, UT 84043
801 768-4422

Native Seed Foundation
Star Route
Moyie Springs, ID 83845
208 267-7938

Northplan Seed Producers
PO Box 9107
Moscow, ID 83843
208 882-8040

Plants of the Wild
PO Box 866
Tekoa, WA 99033
509 284-2848

Porter Lane Wholesale Nursery
PO Box 609
Centerville, UT 84014
801 298-2613
1 800 533-8498

Note: Idaho Department of Fish and Game - Region 3 and Ecological Design, Inc. do not endorse or assure performance of any plant vendor. This list is partial. A complete, current list is available from the publication *Hortus Northwest - A Pacific Northwest Native Plant Directory and Journal*, PO Box 955, Canby OR 97013, 503 260-7968.

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